C 55.108: Au 8

Training Guide for AFOS Operators

Developed by
The AFOS Instructor Staff
AFOS Training Program

June 1, 1978

PENNSYLVANIA STATE UNIVERSITY
AUG 31 1978
DOCUMENTS COLLECTION

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

UPDATE/CHANGE CHECKLIST

Change #	✓	Ch-Topic	Page	Date	Change #	✓	Ch-Topic	Page	Date
Revision 1				7/13/78					

PREFACE

The AFOS Training Guide has been written to present, in as concise a manner as possible, all the information necessary to successfully operate the AFOS system.

The information is broken into three parts. The first part, which will be presented a week or two before your actual training on the equipment, is intended to provide an overview of the system. The nature of the communications circuit to be used in AFOS is discussed. There is also an introduction to the various types of equipment used in the system along with a discussion of the types of system failures which can occur.

The second part will be used for your training session with an AFOS instructor. The actual step-by-step procedures necessary to operate the system will be presented. Techniques used to recover from system failures will also be included in this section.

Third, in order to present the material in parts one and two as concisely as possible, most technical information has been omitted. This information will be included as appendices to the Training Guide. A Glossary is also included.

The goal of the AFOS Training Program is to have all operational Weather Service personnel, at the completion of their total training, able to operate the AFOS system with competence and confidence. This Training Guide is an integral part of that program.

U. S. Depository Copy

Intentionally Left Blank

TABLE OF CONTENTS

PAGE

PREFACE 1

CHAPTER 1: AFOS COMMUNICATIONS OVERVIEW 1-0-1

INTRODUCTION 1-0-3

TOPIC 1: NATIONAL DISTRIBUTION CIRCUIT

INTRODUCTION 1-1-0

SECTION A: The National Distribution Circuit .. 1-1-1
SECTION B: Date Transmission on the NDC 1-1-1
SECTION C: NDC Message Format 1-1-2
SECTION D: Message Transmission Priority 1-1-3
SECTION E: Message Transmission Rates 1-1-5
SECTION F: Data Entry Locations 1-1-5

TOPIC 2: STATE DISTRIBUTION CIRCUIT (SDC)

INTRODUCTION 1-2-0

SECTION A: State Distribution Circuits 1-2-1
SECTION B: NWS Offices not on the NDC/SDC 1-2-1

TOPIC 3: OTHER COMMUNICATIONS CIRCUITS INTERFACED WITH AFOS

INTRODUCTION 1-3-0

SECTION A: NOAA Weather Wire (NWW) 1-3-1
SECTION B: The Overlay Circuits 1-3-1
SECTION C: The "Gateway" Operation 1-3-2

TOPIC 4: NATIONAL CENTERS INTERFACED WITH AFOS

INTRODUCTION 1-4-1

SECTION A: The Systems Monitoring and Coordination Center (SMCC) 1-4-2
SECTION B: SMCC, NMC, and NCC Network 1-4-5
SECTION D: National Severe Storms Forecast Center (NSSFC) 1-4-5
SECTION E: Air Force Global Weather Center (AFGWC) 1-4-5

TABLE OF CONTENTS

CHAPTER 2: AFOS EQUIPMENT 2-0-3

INTRODUCTION 2-0-3

TOPIC 1: OPERATOR'S CONSOLE

INTRODUCTION 2-1-0

SECTION A: The Alphanumeric Display Module 2-1-1
SECTION B: The ADM Keyboard 2-1-4
SECTION C: The Graphic Display Module 2-1-17

TOPIC 2: THE COMMUNICATIONS/COMPUTER MODULE

INTRODUCTION 2-2-0

SECTION A: The S/230 Eclipse Minicomputer 2-2-1
SECTION B: The Data Transfer and Control Assembly (DTCA) 2-2-3
SECTION C: The Disk Storage System 2-2-5
SECTION D: The Diskette Archival System 2-2-10
SECTION E: Electronics Industries Association (EIA) Switch Panel 2-2-13
SECTION F: AC Power Control (ACPC) Unit for The CCM 2-2-15

TOPIC 3: PRINTER/PLOTTER MODULE AND KEYBOARD/PRINTER

SECTION A: The Printer/Plotter Module (PPM).... 2-3-0
SECTION B: The Keyboard/Printer (KB/P) 2-3-1

CHAPTER 3: AFOS DATA BASE OVERVIEW .....

INTRODUCTION 3-0-3

TOPIC 1: STORAGE OF DATA BASE PRODUCTS

SECTION A: The Product Identifier (CCCNNNXXX).. 3-1-0
SECTION B: The Node Identifier (CCC) 3-1-2
SECTION C: The Category Inventory List (CIL) .. 3-1-3
SECTION D: The Product Inventory List (PIL) ... 3-1-5
SECTION E: The Data Base 3-1-6
SECTION F: SDC and NDC Node Data Storage Relationship 3-1-7

TOPIC 2: DATA BASE STORAGE ON DISK

SECTION A: The AFOS Disk..... 3-2-0

TABLE OF CONTENTS

CHAPTER 4: SYSTEM OPERATION 4-0-1

INTRODUCTION 4-0-3

TOPIC 1: FAULT RECOGNITION AND SYSTEM ANALYSIS

INTRODUCTION 4-1-0

SECTION A: Failures due to Operator Error 4-1-1
SECTION B: Failures due to System Errors 4-1-2
SECTION C: ADM Error Messages 4-1-3
SECTION D: KB/P Error Messages 4-1-4

TOPIC 2: AFOS/RDOS SYSTEM RECOVERY PROCEDURES

INTRODUCTION 4-2-1

SECTION A: Recovery from an ADM malfunction ... 4-2-2
SECTION B: Recovery from a GDM malfunction 4-2-3
SECTION C: Recovery from AFOS Program Failures. 4-2-4
SECTION D: Recovery from RDOS Program Failures. 4-2-5
SECTION E: Data Base Cleanup using Modify 4-2-7

CHAPTER 5: PRODUCT RETRIEVAL 5-0-1

TOPIC 1: THE CATEGORY INVENTORY LIST (CIL)

INTRODUCTION 5-1-1

SECTION A: Retrieve a Category Inventory List (CIL) and Page Through 5-1-2
SECTION B: Retrieve the National Category Inventory List 5-1-4
SECTION C: Retrieve an International Category Inventory List 5-1-5

TOPIC 2: THE PRODUCT INVENTORY LIST (PIL)

INTRODUCTION 5-2-1

SECTION A: Retrieve a Product Inventory List (PIL) and Page Through 5-2-2
SECTION B: Retrieve a Local Warning Composite PIL 5-2-4
SECTION C: Retrieve the National Warning Composite PIL 5-2-6

TABLE OF CONTENTS

TOPIC 3: ALPHANUMERIC PRODUCTS

SECTION A: Retrieve a Specific Product 5-3-1
SECTION B: Retrieve Several Products 5-3-2
SECTION C: Retrieve All the Latest Products of a Category 5-3-3
SECTION D: Use Parenthesis Techniques to Retrieve Several Products 5-3-4
SECTION E: Retrieve all Stored Versions of a Product 5-3-5

TOPIC 4: GRAPHIC PRODUCTS

SECTION A: Retrieve a Graphic PIL 5-4-1
SECTION B: Retrieve a Graphic Product 5-4-2
SECTION C: Overlay Several Graphic Products ... 5-4-3
SECTION D: Use Parenthesis Technique to Overlay Graphic Products 5-4-4
SECTION E: Overlay the Three Most Current Versions of a Graphic 5-4-5

TOPIC 5: LIST OF PRODUCT RETRIEVAL COMMANDS 5-5-1

CHAPTER 6: MESSAGE COMPOSITION 6-0-1

INTRODUCTION 6-0-2

TOPIC 1: THE HEADER BLOCK

INTRODUCTION 6-1-1

SECTION A: Complete a Header Block 6-1-2

TOPIC 2: COMPOSING MESSAGES

SECTION A: Compose a Free Text Message 6-2-1
SECTION B: Text Accumulate 6-2-2
SECTION C: Compose and Overlay an Alphanumeric Product on a Graphic 6-2-3

TOPIC 3: PREFORMATTED MESSAGES

SECTION A: Use a Preformatted Message 6-3-1
SECTION B: Compose a Preformat 6-3-3

TOPIC 4: EDITING MESSAGES

SECTION A: Edit a Product 6-4-1

TOPIC 5: THE PAPER TAPE PUNCH

SECTION A: Terminate and Activate the Paper Tape Punch 6-5-1
SECTION B: Manually Punch a Tape 6-5-2
SECTION C: Teletype Character Conversions 6-5-3

TABLE OF CONTENTS

TOPIC 6: LIST OF MSG COMMANDS 6-6-1

CHAPTER 7: ALARM/ALERT 7-0-1

INTRODUCTION 7-0-2

TOPIC 1: DESIGNATING ALARM/ALERT PRODUCTS

SECTION A: Designate Special Consoles 1 and 2 . 7-1-1
SECTION B: Designate a Product to Activate the Alarm or Alert 7-1-2
SECTION C: Cancel a Previous Alarm/Alert Designation for a Product 7-1-3
SECTION D: List the Products which Activate the Alarm or Alert 7-1-4

TOPIC 2: DISPLAYING ALARM/ALERT PRODUCTS

SECTION A: Clear the Alarm 7-2-1
SECTION B: Clear the Alert 7-2-2
SECTION C: How to Clear Multiple Alarm/Alerts . 7-2-3
SECTION D: Display the Alarm/Alert Queue 7-2-4

TOPIC 3: SUPPLEMENTAL INFORMATION

SECTION A: Alarm/Alert Events 7-3-1
SECTION B: Console Activation 7-3-2

TOPIC 4: LIST OF ALARM/ALERT COMMANDS .....

CHAPTER 8: COMPUTER ASSISTED PROGRAMS 8-0-1

TOPIC 1: PROCEDURES 8-1-1

SECTION A: Activate a Procedure 8-1-1
SECTION B: Terminate a Procedure 8-1-2
SECTION C: Supplemental Information 8-1-3
SECTION D: Complete a Procedure Preformat 8-1-4
SECTION E: Name or Rename a Procedure or Delete a Procedure from storage 8-1-7

TOPIC 2: LIST OF COMMANDS

CHAPTER 9: DATA BASE COMMANDS 9-0-1

TOPIC 1: FILE COMMANDS

SECTION A: Save Commands 9-1-1
SECTION B: Store Commands 9-1-2
SECTION C: List Command 9-1-3
SECTION D: Display Command 9-1-4
SECTION E: Delete Command 9-1-5

TABLE OF CONTENTS

TOPIC 2: NDC/SDC DATA TRANSMISSION

SECTION A: Send Commands 9-2-1
SECTION B: Mail Commands 9-2-2

TOPIC 3: WISH LIST

INTRODUCTION 9-3-1

SECTION A: Display the Wish List 9-3-2
SECTION B: Add a Product to the Wish List ... 9-3-3
SECTION C: Delete a Product from the Wish List 9-3-4

TOPIC 4: LIST OF DATA BASE COMMANDS 9-4-1

CHAPTER 10: ARCHIVING 10-0-1

INTRODUCTION 10-0-2

TOPIC 1: ARCHIVE STATUS

SECTION A: Determine Archive Status 10-1-1
SECTION B: Terminate and Restart Archive 10-1-2
SECTION C: Initialize Archive 10-1-3

TOPIC 2: MANUAL ARCHIVING

SECTION A: Archive a Product Manually 10-2-1

TOPIC 3: RETRIEVING ARCHIVED DATA

SECTION A: The List Command 10-3-1
SECTION B: Retrieval of Information 10-3-2

TOPIC 4: LIST OF ARCHIVE COMMANDS 10-4-1

TABLE OF FIGURES

Page Numbers List First Appearance Of Figures

Figure 1-1	AFOS National Distribution Circuit	1-1-0
Figure 1-2	Message Transmission Rates	1-1-4
Figure 1-3	Message Transmission Rates	1-1-4
Figure 1-4	AFOS State Distribution Circuits	1-2-0
Figure 1-5	SMCC Data Distribution	1-4-4
Figure 2-1	Operator's Console	2-1-0
Figure 2-2	ADM CRT Controls	2-1-1
Figure 2-3	ADM CRT	2-1-2
Figure 2-4	ADM Keyboard	2-1-4
Figure 2-5	Standard Keyboard and Special Function Keys in Groups	2-1-4
Figure 2-6	Group 2	2-1-5
Figure 2-7	Group 3	2-1-9
Figure 2-8	Group 4	2-1-11
Figure 2-9	Tab, Escape, and Control Keys (Group 5)	2-1-13
Figure 2-10	Edit Text Keys (Group 6)	2-1-15
Figure 2-11	GDM CRT	2-1-16
Figure 2-12	CRT Controls	2-1-18
Figure 2-13	Display Control Panel	2-1-20
Figure 2-14	CCM	2-2-0
Figure 2-15	Eclipse Computer Console	2-2-1
Figure 2-16	DTCA	2-2-3
Figure 2-17	Disk Drive Controls	2-2-7
Figure 2-18	Diskette Drive	2-2-10
Figure 2-19	Single Minicomputer Configuration	2-2-12

TABLE OF FIGURES

Figure 2-20	Typical Two Minicomputer Configuration	2-2-13
Figure 2-21	ACPC Unit	2-2-15
Figure 2-22	The PPM	2-3-0
Figure 2-23	The KB/P	2-3-1
Figure 2-24	Operator's Controls	2-3-2
Figure 2-25	KB/P	2-3-4
Figure 3-1	Node Identifier	3-1-2
Figure 3-2	Product Category	3-1-3
Figure 3-3	Product Designator	3-1-5
Figure 3-4	Data Base	3-1-6
Figure 3-5	Data Flow	3-1-7
Figure 5-1	Sample Local CIL	5-1-3
Figure 5-2	Sample PIL	5-2-3
Figure 5-3	Sample Composite PIL	5-2-5
Figure 6-1	Sample Header Block	6-1-4
Figure 8-1	Sample Procedure Preformat	8-1-6

MINI GLOSSARY

The following is a brief list of some of the more commonly used terms which will be encountered in the material which follows. A glossary of AFOS terminology can be found at the end of this document.

A	1. Alphanumeric as an ADM 2. Alphanumeric Display Screen as in AG, AK, AGG, etc.
ADM	Alphanumeric Display Module
AFOS	Automation of Field Operations and Services
AG AGG AGGG	AFOS Operator Console Configurations of one Alphanumeric Display Module and one, two, or three Graphic Display Modules
AK	Alphanumeric Display Screen with Keyboard
CCM	Communications Computer Module
CRT	Cathode Ray Tube - the electronic display screen
DISK	A flat circular metal plate with magnetic material on both sides, on which data can be stored by selective magnetization. The DISK is continuously rotated and is read or written on (data stored) by means of one or more read/write heads mounted on movable or fixed arms. DISKS may be premanently mounted on a shaft (fixed disk) or may be contained in an assembly that allows easy removal and replacement (removable DISK or DISK pack).

DISKETTE (ALSO FLOPPY DISK OR FLEX DISK)	A flat round piece of flexible material covered with magnetic particles (on one or both sides). The DISKETTE is encased in a square protective cover, with write protect, indexing, read/write, and disk drive openings. The DISKETTE is continuously rotated and accessed by a single read/write head on a movable arm.
KB/P	Keyboard/printer
NDC	National Distribution Circuit
RAS	Remote Assistance Section
RDOS	Real-Time Disk Operating System
SDC	State Distribution Circuit (occasionally called a Star Network)
SMCC	System Monitoring and Coordination Center

CHAPTER 1

AFOS COMMUNICATIONS OVERVIEW

Intentionally Left Blank

AFOS COMMUNICATIONS OVERVIEW

INTRODUCTION

Since the inception of the old "Weather Bureau" to the present communications have made the NWS work

AFOS follows in the long line of improved communications. At a rate of 40 times that of RAWARC and 10 times the total communications of the present offices AFOS represents a "quantum" jump in the flow of information on NWS and the outside users lines.

In this chapter the central nervous system of AFOS will be discussed as well as the 50 plus pressure points (WSFO s). Additionally, the discussion will lead into the impact of the system's "vital organs" (the National Centers). When you have finished this chapter you will understand the AFOS communications system and the way your office interfaces with the system.

AFOS COMMUNICATIONS OVERVIEW

TOPIC 1 NATIONAL DISTRIBUTION CIRCUIT (NDC)

INTRODUCTION

"The backbone communications circuit for he AFOS system is called the National Distribution Circuit (NDC). The NDC is a closed loop 2400 bit per second circuit comprised of leased dedicated, voice grade telephone linkages between entry points The NDC is full duplex with ADCCP line protocol."

This quote has been used several times in the AFOS Version I User Capabilities AFOS Newsletter etc. In this portion of the Training Guide we will delve deeper into AFOS Communications and hopefully, clarify any misconception.

This Topic represents a revision and update of a portion of the AFOS Version I User Capabilities booklet that was distributed to NWS Field Offices about July 1977. Although some of the specific details may have been changed or altered, the basic, overall concepts of AFOS operations are still valid.

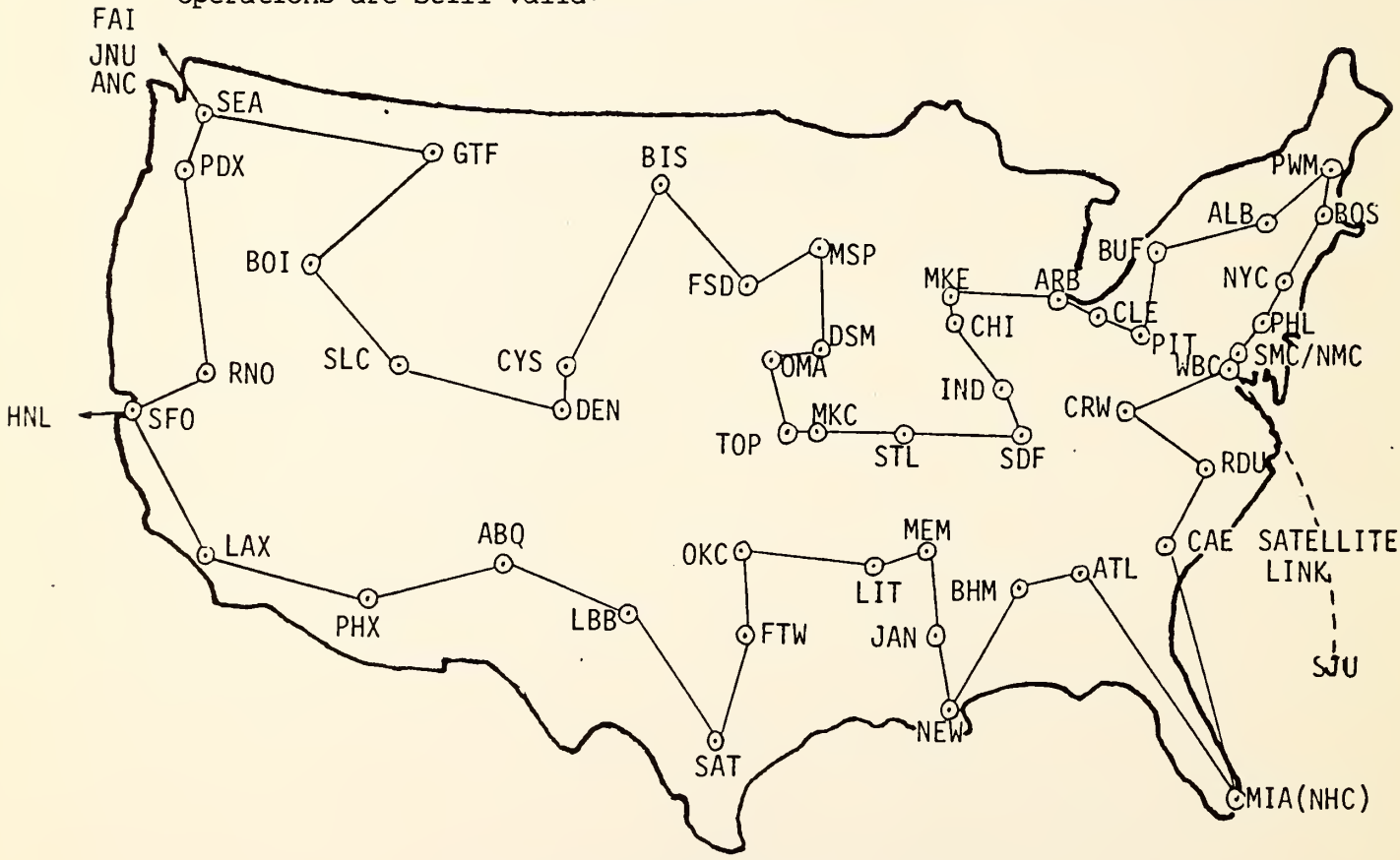


Figure 1-1
AFOS National Distribution Circuit

SECTION A: The National Distribution Circuit (NDC)

EXPLANATION: The NDC is a high-speed, closed-loop computer-to-computer communications network (Figure 1-1). Its simultaneous two-way full-duplex communications occur between two users.

Being a computer to-computer network, data transmission over the NDC adheres to the Advanced Data Communications Control Procedures (ADCCP) line protocol. ADCCP line protocol is an established set of procedures and standardized formats, developed by the computer industry, for high speed communications between computers over telephone lines.

SECTION B: Data Transmission on the NDC

EXPLANATION: Data flows around the NDC in the following manner: An office (e.g., WSFO) enters data onto the NDC via its minicomputer. All information entered onto the circuit travels in both directions from the entering location.

Upon receipt at a NWS office, the message header is compared to the list of products that are to be stored in that computer's data base. If the message is one to be stored at that location, a copy is put on the magnetic disk for local retrieval , otherwise, no copy is saved. The message is then passed on to the next station on the NDC. At some point, approximately half way around the circuit, the arriving message will already have been received from the other direction; the message is then cancelled.

This capability is commonly referred to as the "store and forward" concept.

SECTION C: NDC Message Format

EXPLANATION: Data transmitted on the NDC has a special format designed for high-speed communications between computers. The format for all information, both alphanumeric and graphic, is digital.

The digital format is contained within one or more AFOS message blocks. An AFOS message block, including product and communications header, cannot exceed 256 alphanumeric characters or bytes, where a byte is 8 bits.

All messages for transmission on the NDC/SDC are automatically put into AFOS message blocks. If the message contains more than 256 characters, it is transmitted as two or more message blocks. The average number of blocks for a few selected product categories are given below:

Product Category (NNN)	Average Number Of Blocks
State Forecast (SFP)	1
Zone Forecasts (ZFP)	9
National Weather Summary (NWX)	21
Selected Cities Summary (SCS)	27
Surface Observation (SAO)	1
Terminal Forecast (FTA)	1
Tornado or Severe TSTM Watch (SEL)	3

SECTION D: Message Transmission Priority

EXPLANATION: Each message transmitted on the NDC/SDC is automatically assigned one of five transmission priority levels. This guarantees that vital messages are transmitted ahead of routine products. Priority 1 messages, such as severe weather, and Flash Flood warnings, are the highest, while priority 5 messages, such as verification and statistics, and administrative messages are the lowest. Most types of observations will be priority 3. Routine products such as most public, aviation and marine forecasts, and NMC graphics are priority 4. Transmission of messages with the same priority is done on a "first in-first out" basis.

Certain messages will have a variable priority. When filling out the message header block (discussed in 5.2.5 of Site Capabilities of the AFOS Users Guide) you will be able to enter, if circumstances warrant, a higher priority level. An example of this is the Special Weather Statement (SPS) category which covers the range from record high temperatures to warning updates.

The time it takes to receive a routine message (priority level 4) will vary from seconds to minutes depending on the weather situation, i.e., the volume of higher priority traffic on the NDC. Calculations indicate that, even during time of high NDC traffic, priority 1 messages, i.e., warnings, will take no longer than 45 seconds to be received at all stations on the NDC.

The priorities assigned to each message type may be found in an Appendix to the AFOS Users Guide.

TABLE 1

RAWARC	-	100 WPM
OVERLAY	-	100 WPM
Service A, C, & O	-	100 WPM per circuit
NOAA Weather Wire Service	-	75 WPM
NDC	-	5000 AFOS Blocks per hour

$$\text{NDC Capacity} = \frac{(5000 \text{ blocks/hr})(256 \text{ ch/block})}{(60 \text{ min/hr})(5 \text{ ch/word})} = 4267 = 4300 \text{ WPM}$$

$$\text{NDC/RAWARC} = \frac{4267 \text{ WPM}}{100 \text{ WPM}}$$

40 times faster than any of the pre-AFOS circuits
or almost 8 times as much capacity as all of the above combined
TTY circuits (RAWARC + Overlay + NWWS + Services A, C, & O).

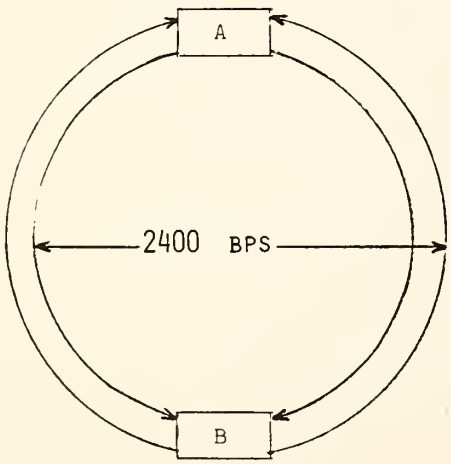


Figure 1-2

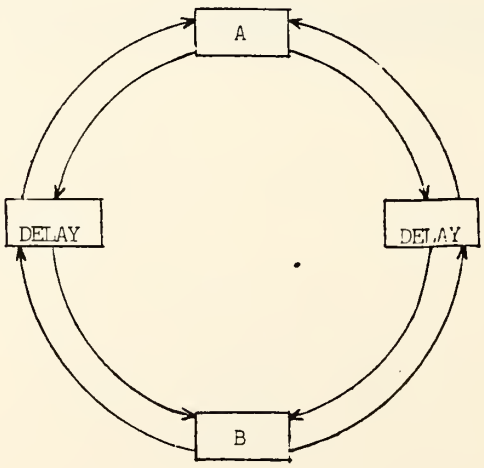


Figure 1-3

SECTION E: Message Transmission Rates

EXPLANATION: You may be wondering how AFOS (NDC) communications compare with the current (Pre-AFOS) communication circuits (RAWARC Overlay, Services A, C, & O). Using a 5000 block per hour average capacity, the NDC rate figures out to around 4300 words per minute (see Table 1). Since RAWARC, Overlay, Services A, C, & O all operate at approximately 100 words per minute one can see that the NDC can carry approximate 40 times as much information as any one of the current circuits.

Graphic transmission over the NDC will also be much faster and more timely than the current facsimile circuits. As soon as graphics become available at NMC, they will be transmitted. Currently, a NWS office receives approximately one graphic every 10 minutes over facsimile (see your NAFAX facsimile schedule). With the NDC, you will be receiving the same graphic in less than a minute.

Theoretically, messages travel around the NDC at the rate of 2400 bits per second (BPS). Converting this value to AFOS message blocks you get 8400 blocks per hour. In actuality, due to delays within the computers at offices on the NDC the NDC capacity has been estimated at 4500 to 6000 blocks per hour (75 to 100 blocks per minute).

$$\frac{(2400B/S)(3600S/HR)}{(256CH/BLK)(8B/CH)} \times 2 = 8400 \text{ BLK/HR} - \text{Theoretical Capacity}$$

(See Figure 1-2)

Actual Capacity = 4500 to 6000 BLK/HR (Figure 1 3)

SECTION F Data Entry Locations

EXPLANATION: Those locations that serve as entry points on the closed-loop NDC (for their own products and those produced by other NWS offices) are called nodes.

All WSFOs, NSSFC (MKC), and the System Monitoring and Coordination Center (SMCC)* are nodes on the NDC (Figure 1-1). The National Meteorological Center (NMC), National Climatological Center (NCC), and the National Hurricane Center (NHC), are also considered as nodes due to the products and services that they generate.

A more detailed discussion of the National Centers (NMC, SMCC, etc.) is given in Topic 4 of this overview.

*Note: SMCC has the three character node identifier (SMC).

TOPIC 2 STATE DISTRIBUTION CIRCUIT (SDC)

INTRODUCTION

The SDCs are identical to the NDC in communications lines. Both have 2400 baud full-duplex lines. However, they differ in that each SDC is a spur off a parent node (e.g., each SDC office is linked directly to the node).

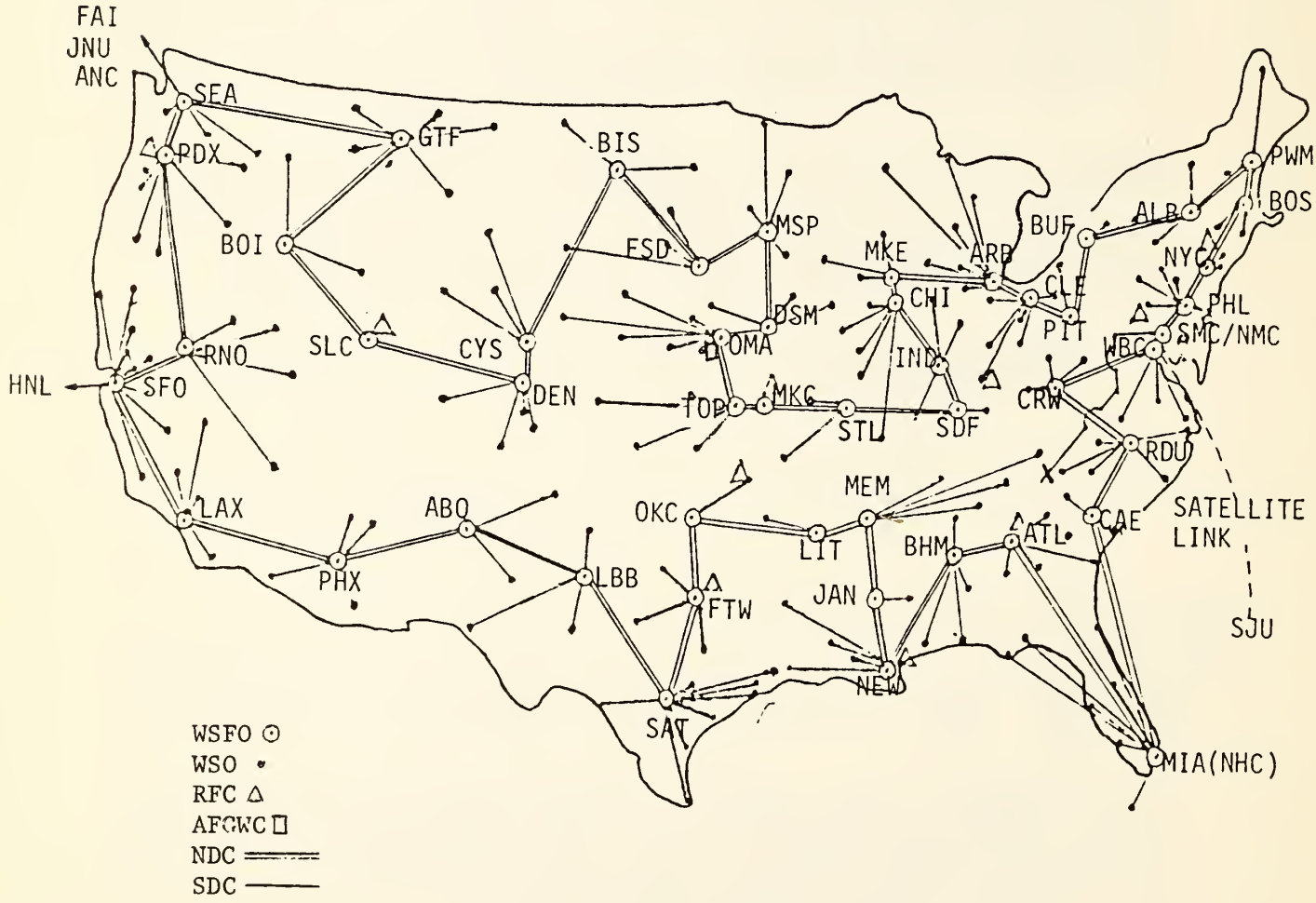


Figure 1-4

SECTION A: State Distribution Circuits (SDC)

EXPLANATION: The communication lines that link other AFOS Computerized NWS locations to the NDC are called State Distribution Circuits (SDC) (see Figure 1-4).

Offices on the SDCs transmit data to and receive their data from the NDC via "Parent" nodes.

The data base storage of a station on the SDC is a subset of the larger NDC data base. Any product required by a station on an SDC must be stored by the "Parent" node.

SECTION B: NWS Offices Not On The NDC/SDC

EXPLANATION: Those locations (mostly WSMOs and smaller, limited operation WSOs) without an AFOS minicomputer will be spurred off an NDC node (WSFO) on lines similar to the SDCs.

All data for display by these small stations will be retrieved from a minicomputer equipped office.

Automated Upper Air and/or Radar (RADAP) sites will eventually be connected via spur circuits to either WSFOs or WSOs.

TOPIC 3: OTHER COMMUNICATIONS CIRCUITS INTERFACED WITH AFOS

INTRODUCTION

Currently, a variety of low speed communications circuits (e.g., NWWS, TWX, Overlay, Fire Weather, etc.) exist at WSFO, WSOs, and RFCs. Most of these circuits will continue after AFOS implementation; however, they must be linked to the AFOS communications network. The AFOS communications subsystem at each NWS site will handle the reception and dissemination of messages to users over these low speed networks.

To date, detailed plans for the operation of only NWWS have been developed. When plans for the other low speed circuits are finalized, a more complete explanation of their functions and operations will be prepared.

"Gateway", the interface of the AFOS network with other agencies and with weather service offices not yet on AFOS, is also briefly outlined.

SECTION A: NOAA Weather Wire Service (NWWS)

EXPLANATION: All state NWWS circuits will be driven by WSFOs when the NDC/SDCs are completed. WSOs that now input data on NWWS will no longer do so after AFOS is operational at the station, except those that serve as NWWS backup sites.

The WSFO (or backup WSO) which is driving a NOAA Weather Wire Circuit will have the following capabilities:

(1) Automatic transmission of all routine NWWS products on a scheduled basis and immediate insertion of non-routine emergency messages.

(2) Automatic monitoring of the NWWS schedule and generation of an alert message for any scheduled products not ready for transmission 5 minutes prior to its scheduled time.

(3) Ability to free transmission time in emergency situations by deleting (on a temporary basis) any product from the NWWS schedule.

(4) Ability to locally create and "permanently" modify the schedule(s) of products to be transmitted on NWWS.

(5) Automatic receipt and storage in the local data base of all NWWS message traffic originated by outside users. The WSFO operator can retrieve the message, assign the proper AFOS header, and transmit it over the NDC/SDC.

(6) Ability to manually select any message to be transmitted from the local station onto NWWS.

(7) Ability to list all products that have been transmitted over NWWS during the past hour.

SECTION B: The Overlay Circuits

EXPLANATION: The overlay circuits at WSFOs will gradually be phased out during AFOS implementation. As a WSFO goes AFOS, the overlay circuits are removed. Upon completion of AFOS implementation in the early 1980's, there will be no overlay circuits.

In the interim, however, products generated at "AFOS"-ized WSFOs will have to be relayed to the overlay circuits at WSFOs not yet converted to AFOS. To accomplish this, the System Monitoring and Coordination Center has been assigned the task of handling the data relaying and switching functions between the overlay circuits and the AFOS network.

SECTION C The "Gateway" Operation

EXPLANATION: The interface of the AFOS communications network with non NWS (e.g., FAA) communication networks and the NWS offices not yet on AFOS is provided by what is called a "Gateway" operation at Suitland, MD.

Conversion of communication message headers and any necessary data reformatting is handled at the "Gateway" so that data can be transferred in and out of the AFOS system.

TOPIC 4: NATIONAL CENTERS INTERFACED WITH AFOS

INTRODUCTION

Essential to overall operations of the NWS are the products and services provided by the National Centers.

The National Meteorological Center (NMC) generates and disseminates the guidance products required for forecast formulation at WSFOs, WSOs, and RFCs.

The National Climate Center (NCC) serves as the archival function of the NWS and services user request for climatological data.

The National Hurricane Center (NHC) and National Servere Storms Forecast Center (NSSFC) provide specialized services to forecast offices; their guidance products and expertise aid NWS forecast offices in issuing forecasts, advisories, warnings, etc., for hurricanes and severe local storms.

The Air Force Global Weather Center (AFGWC) will act as backup to NMC for input of products on the NDC.

With the advent of AFOS, several new centers have emerged with specialized functions. Two of these new centers are the Systems Monitoring and Coordination Center (SMCC) and the Centralized Archival System (CAS).

The various National Centers' communication links to the NDC/SDC network are not only important to, but essential for overall AFOS communications. In the following topic, each individual National Center's interfaced with the NDC is described and their main AFOS related functions are discussed.

SECTION A: The Systems Monitoring and Coordination Center (SMCC)

EXPLANATION: The Systems Monitoring and Coordination Center (SMC/NMC node) is a new facility (co-located with NMC in Suitland, MD) that has been established for the support of AFOS communications. As the NDC has been called "The Backbone Communications Circuit for the AFOS System"; the SMCC is the nerve center or "Brains" of AFOS.

The functions of the SMCC are briefly outlined below:

(1) Maintain cognizance over the operational integrity of the AFOS network. This will be accomplished by the SMCC receiving (via the NDC) both routine and special status reports from all AFOS offices.

(2) Provide communications backup to AFOS sites. This backup will be provided by dial-up lines to/from the SMCC. Communications backup is provided for the following types of failures:

a) complete outage of NDC link(s)

b) failure of an NDC (WSFO) computer system

c) failure of an SDC (WSFO or RFC) computer system

d) failure of an SDC line

e) failure of high speed (2400 bps) spur line to an automated collection site (WSMO, ADAS, RADAP).

(3) Provide data base replenishment to those AFOS sites which have suffered computer failures. This replenishment will occur after the affected computer system is restored to operation.

(4) Provide the interface to the 360/40 computer complex at NMC via a 4800 bps full-duplex link.

(5) Support a high speed (4800 bps) full-duplex link to the National Climatic Center (NCC) of NOAA's EDIS (Environmental Data Information Service) so that they may receive all NWS originated data needed to accomplish their mission.

(6) Provide data interface to the NCC's Centralized Archival System (CAS). The CAS will store certain NDC data for 5 years to satisfy data retention requirements.

continued

(7) Serve as a central distribution point for releases of new/modified AFOS software. New software will be sent to all field offices from the SMCC via the NDC.

(8) Provide the data exchange interface between AFOS and NWS Management information systems maintained at NWS headquarters.

(9) Monitor all NDC traffic to insure that key scheduled NWS data has been transmitted.

(10) Provide the interface between the NDC and the regional overlay circuits.

(11) Answer, in real-time, all field office requests for NDC data stored at SMCC (approximately 30 days worth of NDC traffic).

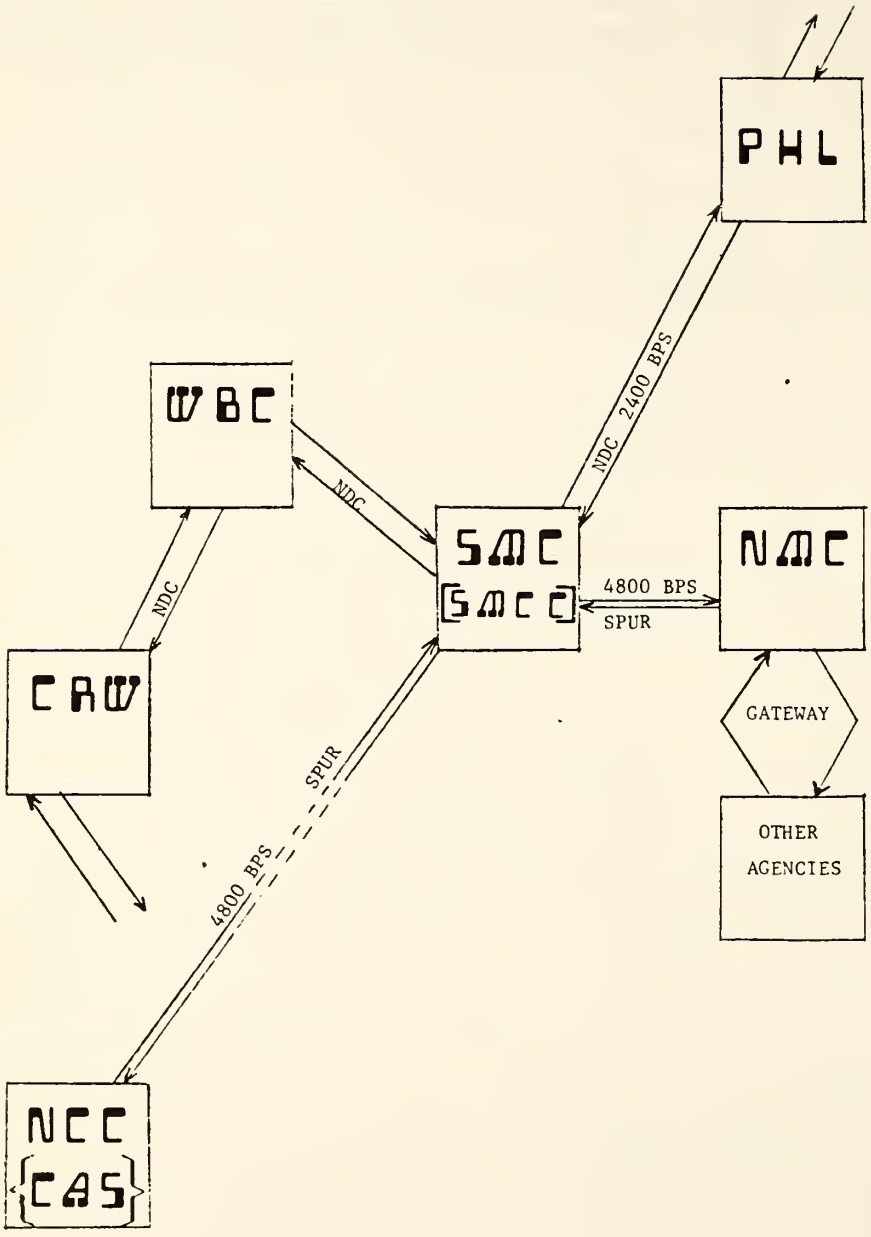

PHL
WBC
NDC
NDC 2400 BPS
SMC
(SMC)
NMC
4800 BPS
SPUR
NDC
CRW
GATEWAY
SPUR
4800 BPS
OTHER
AGENCIES
NCC
(CAS)

Figure 1-5

SECTION B: Systems Monitoring and Coordination Center, National Meteorological Center, the National Climatological Center Network

EXPLANATION: The Systems Monitoring and Coordination Center (SMCC), National Meteorological Center (NMC), and National Climatological Center (NCC) are linked as shown in Figure 1-5.

SECTION C: National Hurricane Center (NHC)

EXPLANATION: The National Hurricane Centrer (NHC) link to the NDC is through WSFO Miami (MIA). NHC is co-located with MIA and will, therefore , enter its products onto the NDC via the MIA node.

NHC's operational functions will remain essentially the same under AFOS.

SECTION D: National Severe Storms Forecast Center (NSSFC)

EXPLANATION: The National Severe Storms Forecast Center (NSSFC), located in Kansas City, MO, is a node on the NDC. The AFOS three letter NDC node designator for NSSFC is MKC.

The operational functions of NSSFC will change very little with AFOS. There will be some minor changes in the formatting of SELS products. For example, it is envisioned that SELS watches will include appropriate area delineators to allow for selectively alarming/alerting the affected field offices.

SECTION E: Air Force Global Weather Central (AFGWC).

EXPLANATION: The Air Weather Service (AWS) has the responsibility of providing backup support for the NWS when NMC is unabale to transmit on AFOS.

The responsibility for initiating backup support will be with SMCC. AFGWC, located at Offutt Air Force Base. NB, will then provide substitute charts to be distributed via AFOS until NMC is able to resume operation. AFGWC is an SDC spur linked to WSFO Omaha (OMA) and will be equipped with a WSO configuration with considerably larger peripheral storage.

CHAPTER 2

EQUIPMENT

AFOS EQUIPMENT

INTRODUCTION

The AFOS equipment at a typical office can be divided into three categories. This chapter discusses each equipment category in the following order:

OPERATOR'S CONSOLE - TOPIC 1

COMMUNICATIONS/COMPUTER MODULE - TOPIC 2

PRINTER/PLOTTER AND KEYBOARD/PRINTER - TOPIC 3

TOPIC 1: OPERATOR'S CONSOLE

INTRODUCTION

An operator will perform his/her office duties with the aid of two similar looking, but different functioning modules.

One module will handle only alphanumeric data and is called an Alphanumeric Display Module or an ADM (Section A).

The other type of module has a double function of alphanumeric data manipulation and graphic display. This module is referred to as a Graphic Display Module or a GDM (Section C).

The numbers of modules at an office will vary according to the needs of the office. These modules are grouped together to form a console.

All modules which comprise a console are controlled by the operator through a keyboard (Section B). All keyboards are attached to ADMs, but not all ADMs will have a keyboard.

An Operator's Console can vary from one ADM with an attached keyboard to a maximum of four modules consisting of both ADMs and GDMs combined.

Figure 2-1 shows one possible grouping of modules comprising an Operator's Console. The figure shows an ADM with a keyboard and a GDM.

The material that follows discusses in greater detail each type of module

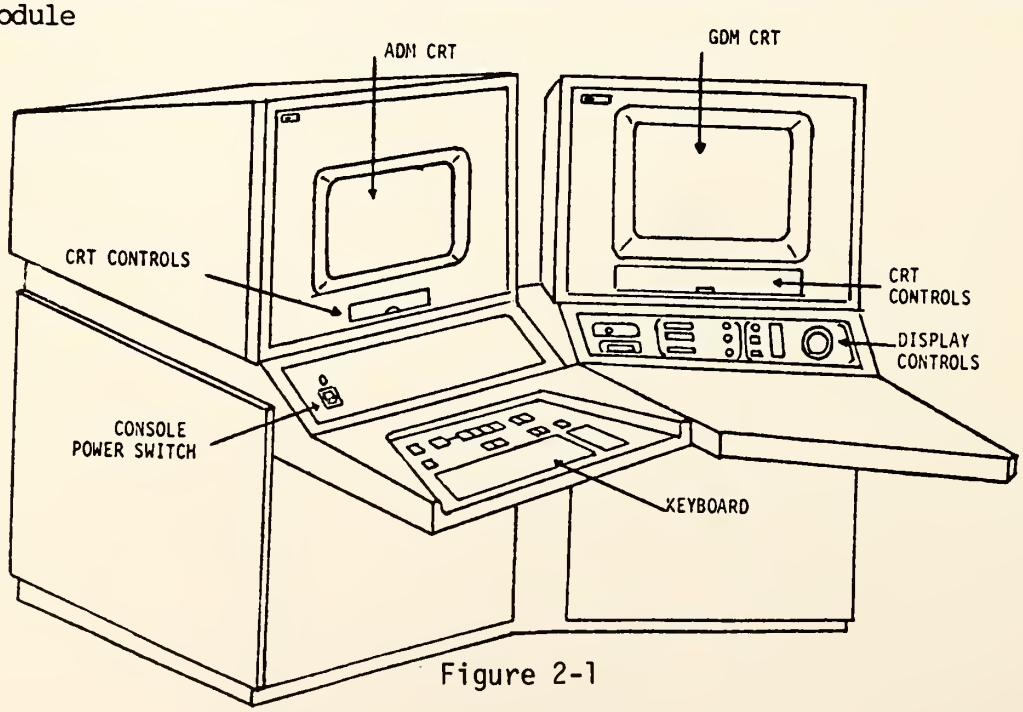


Figure 2-1

Operator's Console

SECTION A: Alphanumeric Display Module (ADM)

EXPLANATION: The ADM is used as a means of alphanumeric data input and/or display for normal AFOS system operation.

All ADMs have a Cathode Ray Tube (CRT) that is similar to a television screen. Directly below the CRT is a hinged door (Figure 2-1), which covers the control knobs. Figure 2-2 shows these controls with the door in the open position.

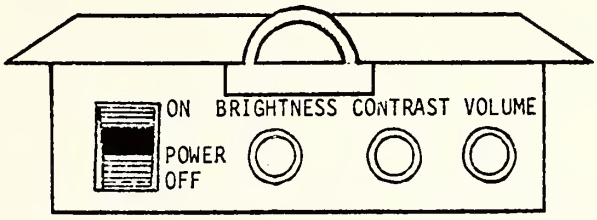


Figure 2-2
ADM CRT Controls

The Control Functions are:

Power Switch	ON/OFF switch for power supply to ADM
Brightness	Adjusts brightness of CRT
Contrast	Adjusts light/dark ratio of screen
Volume	Adjusts loudness of end of line signal in the CRT

continued

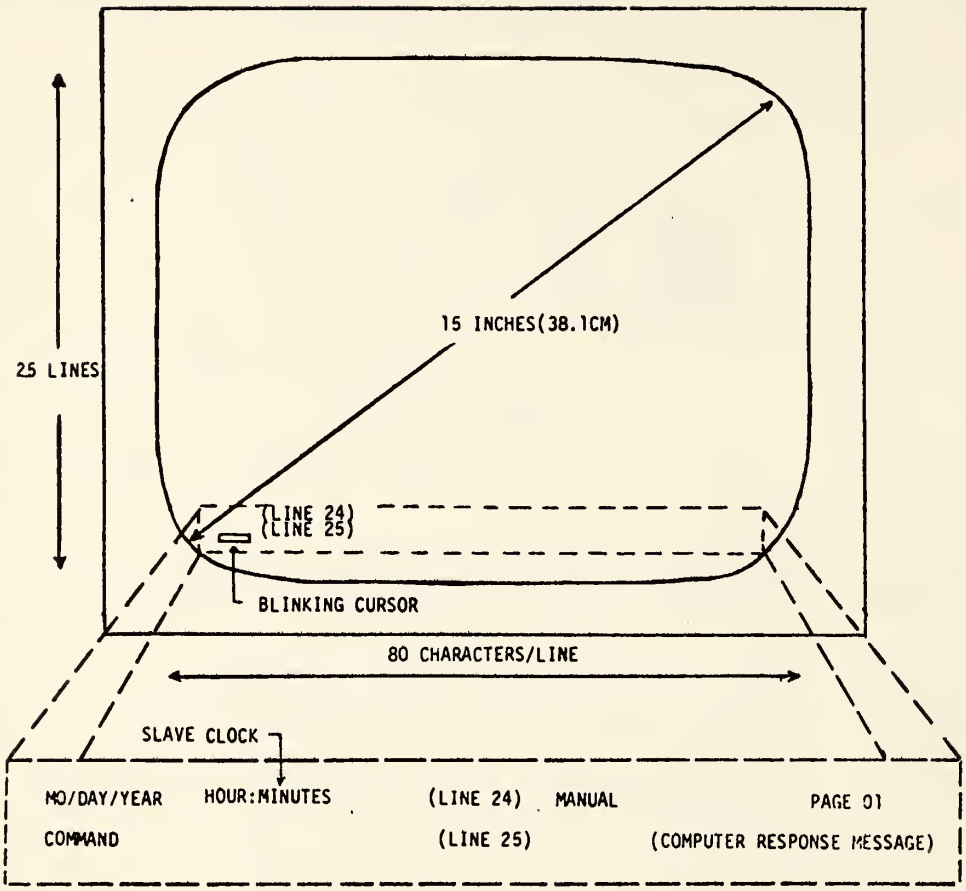


Figure 2-3

ADM CRT

The ADM CRT displays only alphanumeric data and products.

These are the features of a CRT:

1) A 15 inch (38.1 cm.) diagonal black and white screen capable of displaying 25 lines of data with 80 characters/line.

2) A "cursor" shown as a flickering segment of light "▭" that identifies the location of next alphanumeric character to be typed.

3) Lines 1 through 23 are used for message composition and displayed data.

4) Line 24 - left to right:

a) Date - automatically displays month/day/year.

b) Slave Clock - displays time of day accurately to the nearest minute; updated automatically by SMCC every 30 minutes.

c) Manual - word automatically displayed when operator has control of the screen; replaced by another word or phrase when minicomputer has control of CRT.

d) Page Number - indicates page number of data displayed on screen; "PAGE 01" shown when CRT is idle

5) Line 25 - left to right:

a) Operator command messages.

b) Minicomputer response to these input commands.

6) End of Line Signal - a brief beep is sounded when the 71st character of the 80 character line is typed for lines 1 through 23.

7) Tab Stops - automatic tab stops locate the cursor at the start of a string of characters or data which may be typed in when the operator is completing a preformatted text.

The power switch for the entire Operator Console is located on the left front side of the ADM, between the CRT and keyboard (Figure 2 1). A light above the switch glows when power is on.

SECTION B: ADM Keyboard

EXPLANATION: The operator interface with the AFOS software (programs) and with the display modules is done through the ADM keyboard.

The keyboard is essentially a standard typewriter with special function keys (Group 1). (Figure 2-4 and 2-5).

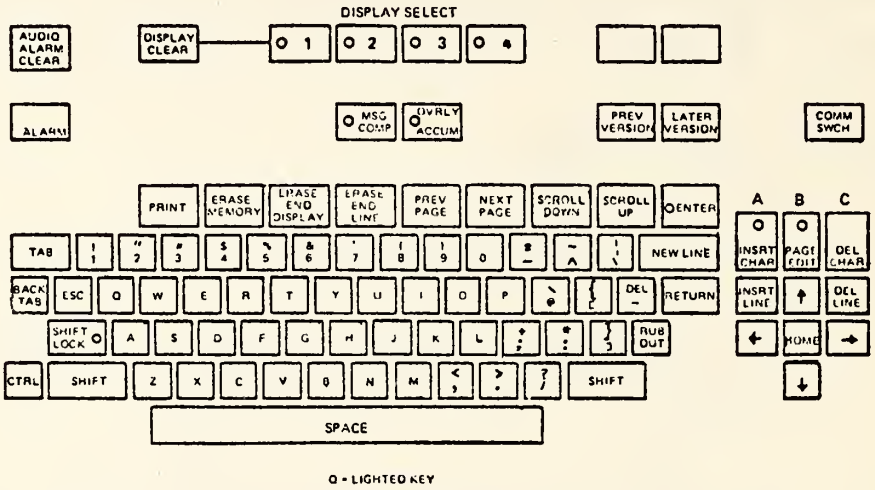


Figure 2-4
ADM Keyboard

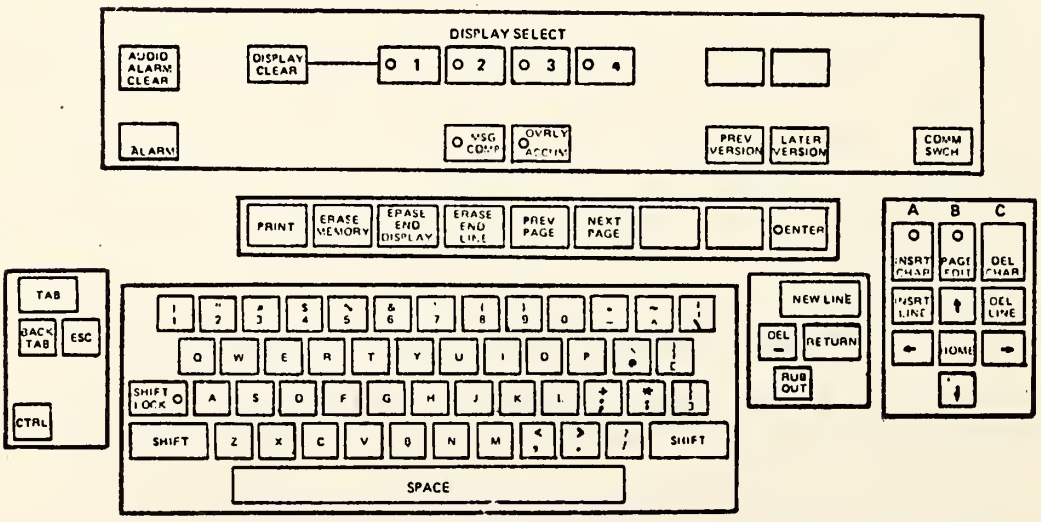


Figure 2-5
Standard Keyboard and
Groups of Special Function Keys

continued

Group 2 consists of the top two rows (Figure 2-6). These keys control the alarm, the selection of display and/or the mode of operation.

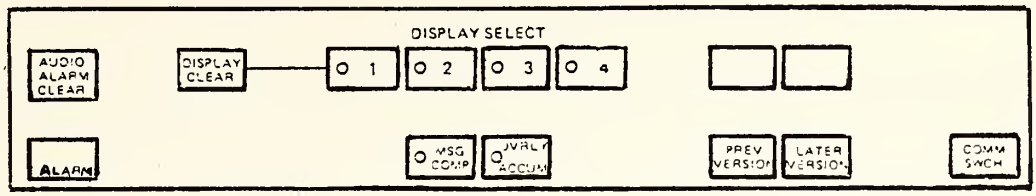


Figure 2-6
(Group 2)
Keys controlling the alarm, selection of display, and mode of operation

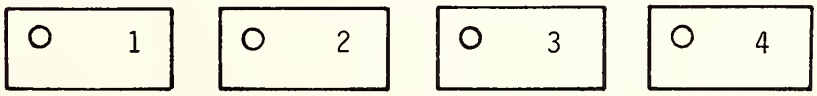
Keys in Group 2 have the following functions:

AUDIO ALARM CLEAR — Used to turn off the audio alarm if product is not going to be displayed immediately.

ALARM — Key light flashed when alarm or alert message is received. Message is displayed by striking key. Striking key will also clear audio alarm as it is activated.

DISPLAY CLEAR — Clears the selected display.

DISPLAY SELECT



The display select consists of four keys. They are used to select one of the available display screens.

Each key has an internal light such that only the last key despressed is lighted and its corresponding display is the only one controlled by the operator until another selection is made. Whenever, a new display is selected, all other display controls remain in their previous selected modes.

continued

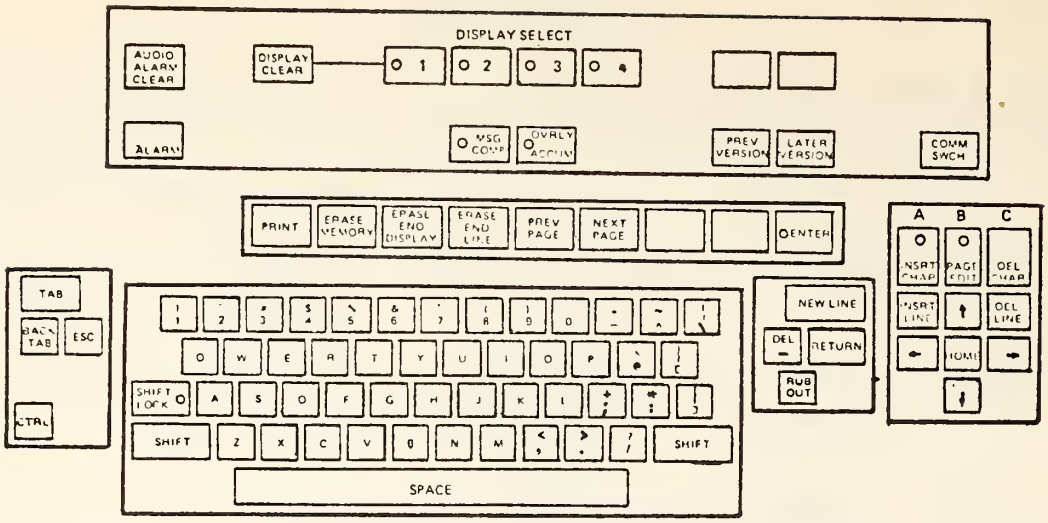


Figure 2-5

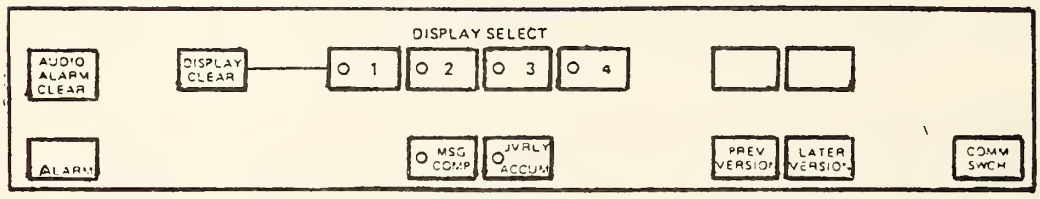


Figure 2-6

Not assigned.

Not assigned.

MSG COMP

Used to place the selected display in message composition mode. The key lights when this mode is activated.

OVRLY ACCUM

Used to enter the selected display into the accumulate/overlay mode. The key lights when this mode is activated.

Note: These modes are deactivated by depressing the key a second time.

PREV VERSION

Used to display a previous version of the currently displayed product.

LATER VERSION

Used to display a later version of the currently displayed product.

COMM SWCH

Used during the backup configuration for selection of the dial up network of dedicated lines.

continued

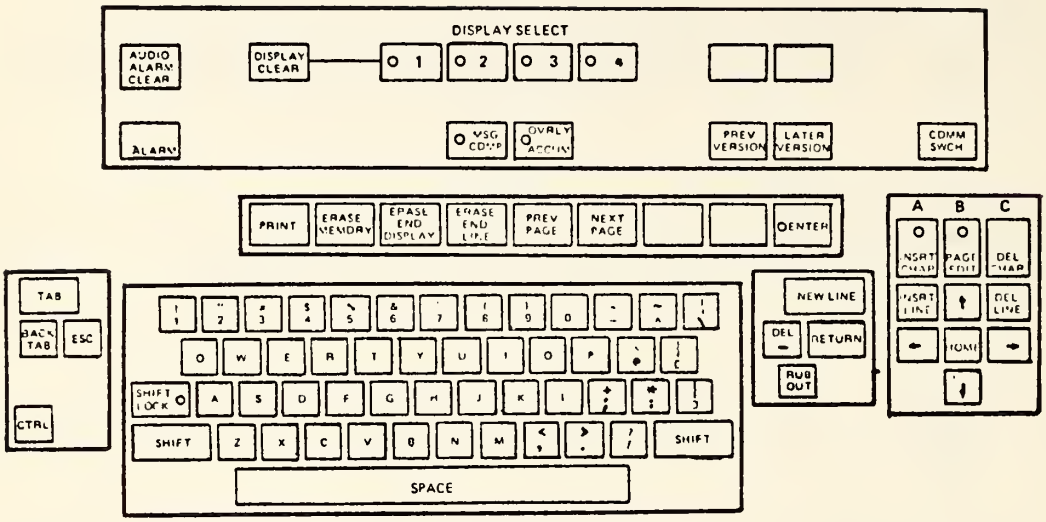

DISPLAY SELECT
AUDIO ALARM CLEAR
DISPLAY CLEAR
1
2
3
4
ALARM
MSG COMP
OVRLY ACCUM
PREV VERSION
LATER VERSION
COMM SWCH
PRINT
ERASE MEMORY
ERASE END DISPLAY
ERASE END LINE
PREV PAGE
NEXT PAGE
ENTER
A
B
C
INSRT CHAR
PAGE EDIT
DEL CHAR
INSRT LINE
DEL LINE
HOME
TAB
BACK TAB
ESC
CTRL
SHIFT LOCK
SHIFT
SPACE
NEW LINE
DEL
RETURN
RUB OUT

Figure 2-5

Figure 2-7
(Group 3)

The keys in Group 3 have a variety of functions:

PRINT	Used to make a hard copy on the printer/plotter module of the data displayed on the ADM.
ERASE MEMORY	Used to erase displayed data as well as stored data waiting to be displayed (the command line is not erased).
ERASE END DISPLAY	Used to erase all data from the cursor position to the end of the display.
ERASE END LINE	Used to erase all data from the cursor position to the end of the line.
PREV PAGE	Used to retrieve the previous page of the displayed product.
NEXT PAGE	Used to retrieve the next page of the displayed product
SCROLL DOWN	Not assigned.
SCROLL UP	Not assigned
ENTER	Used to enter a request or initiate a command.

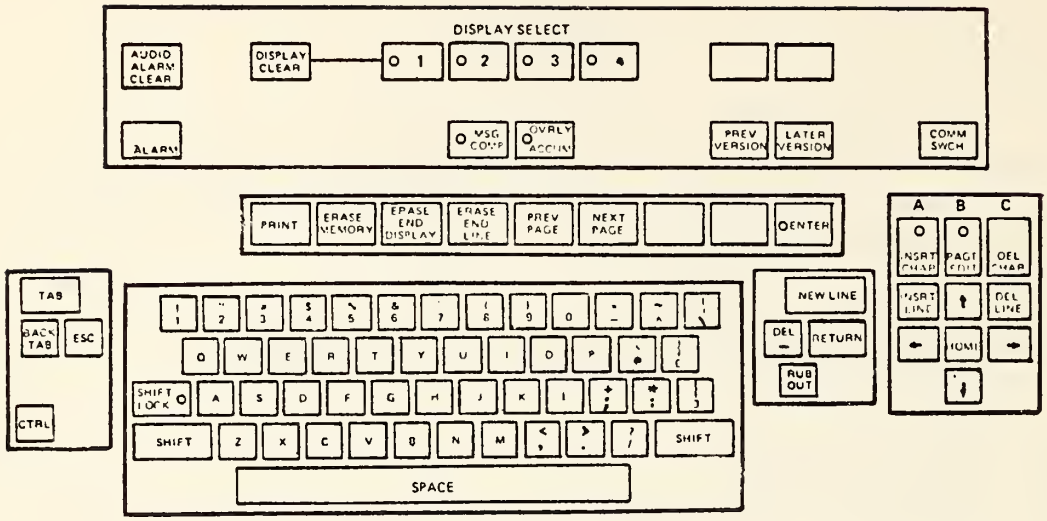

DISPLAY SELECT
AUDIO ALARM CLEAR
DISPLAY CLEAR
1
2
3
4
ALARM
MSG COMP
OVRLY ACCUM
PREV VERSION
LATER VERSION
COMM SWCH
PRINT
ERASE MEMORY
EPASE END DISPLAY
ERASE END LINE
PREV PAGE
NEXT PAGE
ENTER
A
B
C
INSRT CHAR
PAGE EDIT
DEL CHAR
INSRT LINE
DEL LINE
HOME
TAB
BACK TAB
ESC
CTRL
SHIFT LOCK
SHIFT
SPACE
NEW LINE
DEL
RETURN
RUB OUT

Figure 2-5

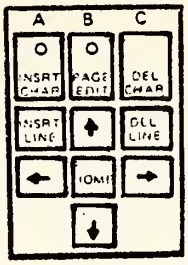


Figure 2-8
(Group 4)
Keys used to Edit Messages Displayed on ADM

Group 4 is composed of the group of 10 keys on the right side of the keyboard (Figure 2-8). In general, these keys are used to move the cursor to the desired locations in the displayed text or to make physical changes in the text at the position of the cursor.

HOME — Used to move the cursor to the upper lefthand position on the display.

↑ ← → ↓ — Used to move the cursor in the direction indicated.

The next four keys operate only in Message Composition mode.

O INSERT CHAR — Used to move data one character to the right leaving a space at the cursor position for the insertion of a character. Deactivated by pressing a second time.

DEL CHAR — Used to delete a character at the cursor position and move all data to the right of the cursor position one position to the left.

continued

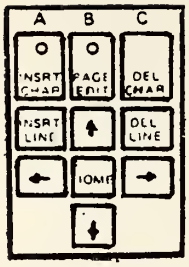


Figure 2-8

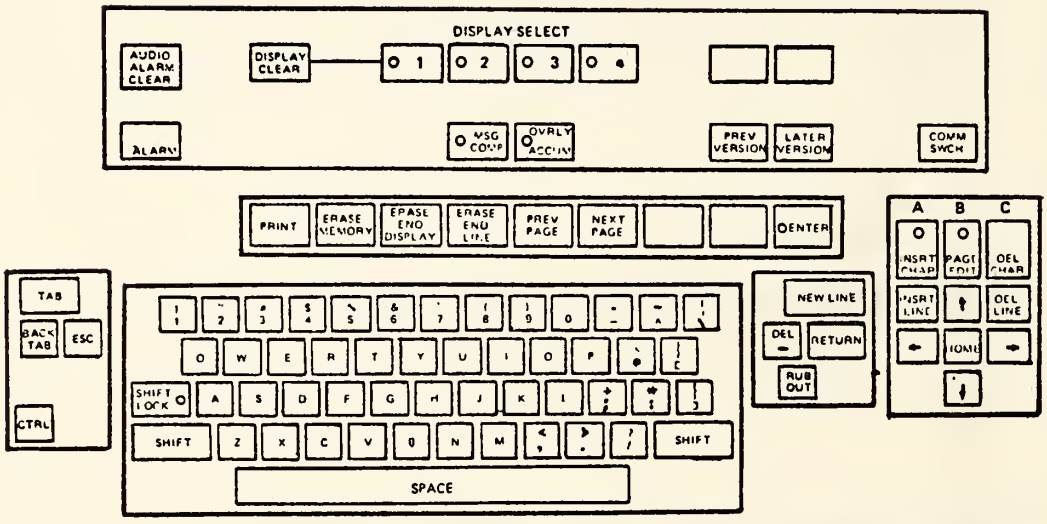


Figure 2-5

O PAGE EDIT	Places character insert and delete keys on a page basis rather than a line basis. As characters (including spaces) are inserted, those characters to the right of the cursor are moved one position to the right. Deactivated by pressing a second time.
INSERT LINE	Used to move data down one line for insertion of a new line. The cursor must first be positioned on the line to be moved and space must be available on the page for the additional line. Data on the lines above the cursor are not affected.
DEL LINE	Used to delete the line of data on which the cursor is positioned and to move the remaining data up one line.

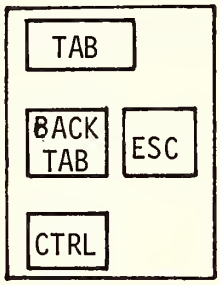


Figure 2-9
(Group 5)
Tab, Escape, and Control

Group 5 consists of Tab keys and keys used to abort certain programs.

TAB BACK TAB	Used to advance or return the cursor to predetermined position on the display screen.
ESC	Not assigned
CTRL	Used in connection with abort commands. This key is held down while striking the "A" key.

continued

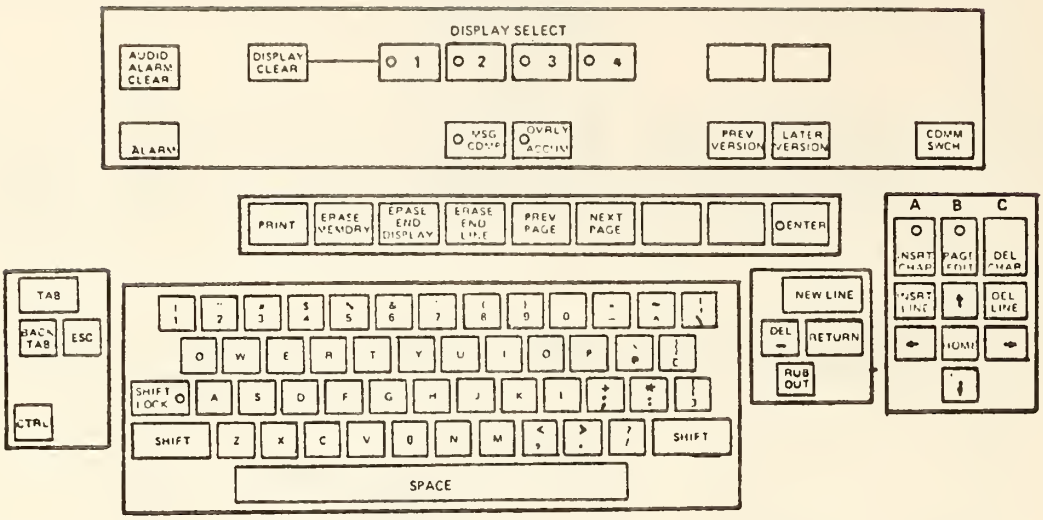

DISPLAY SELECT
AUDIO ALARM CLEAR
DISPLAY CLEAR
1
2
3
4
ALARM
MSG COMP
OVRLY ACTIV
PREV VERSION
LATER VERSION
COMM SWCH
PRINT
ERASE MEMORY
ERASE END DISPLAY
ERASE END LINE
PREV PAGE
NEXT PAGE
ENTER
A
B
C
INSRT CHAR
PAGE EDIT
DEL CHAR
INSRT LINE
DEL LINE
HOME
TAB
BACK TAB
ESC
CTRL
SHIFT LOCK
SHIFT
SPACE
NEW LINE
DEL
RETURN
RUB OUT

Figure 2-5

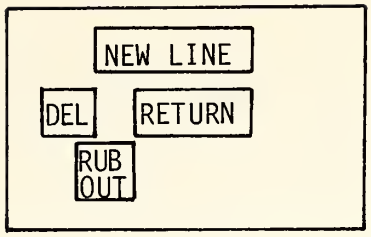


Figure 2-10
(Group 6)
Edit Text Keys

Group 6 keys are discussed below.

NEW LINE	Used in edit mode to move cursor to start of next paragraph; automatically gives two line feeds.
DEL	Used to replace the character to the left of the cursor with a dash.
RETURN	Used to move the cursor to the beginning of the line it is presently on.
RUB OUT	Used to delete the character just left of the cursor.

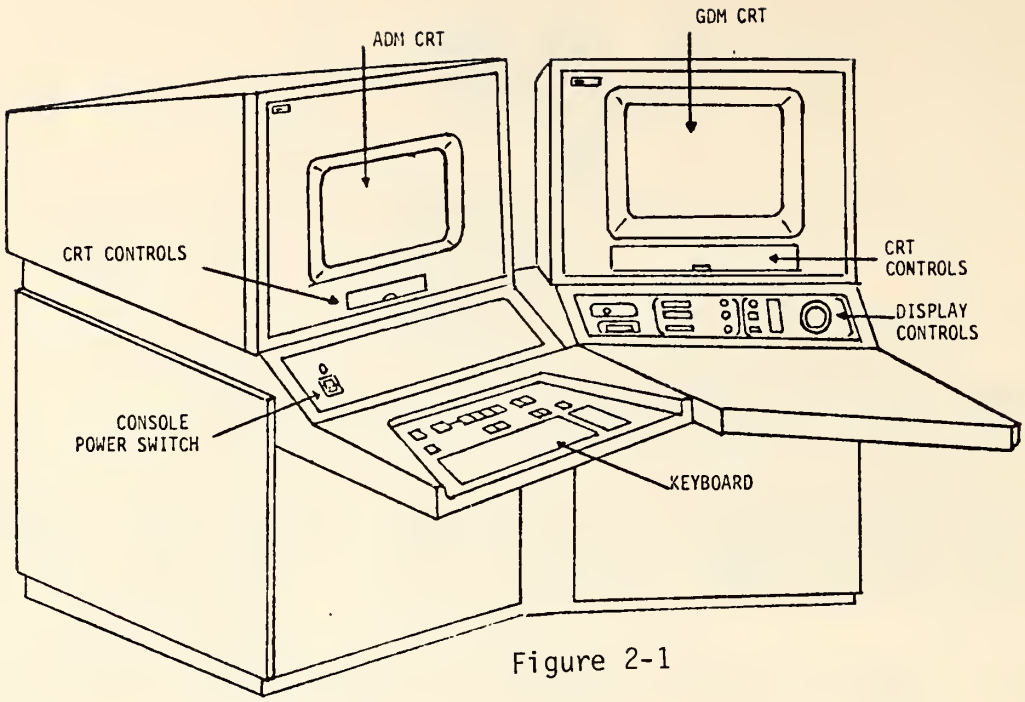


Figure 2-1

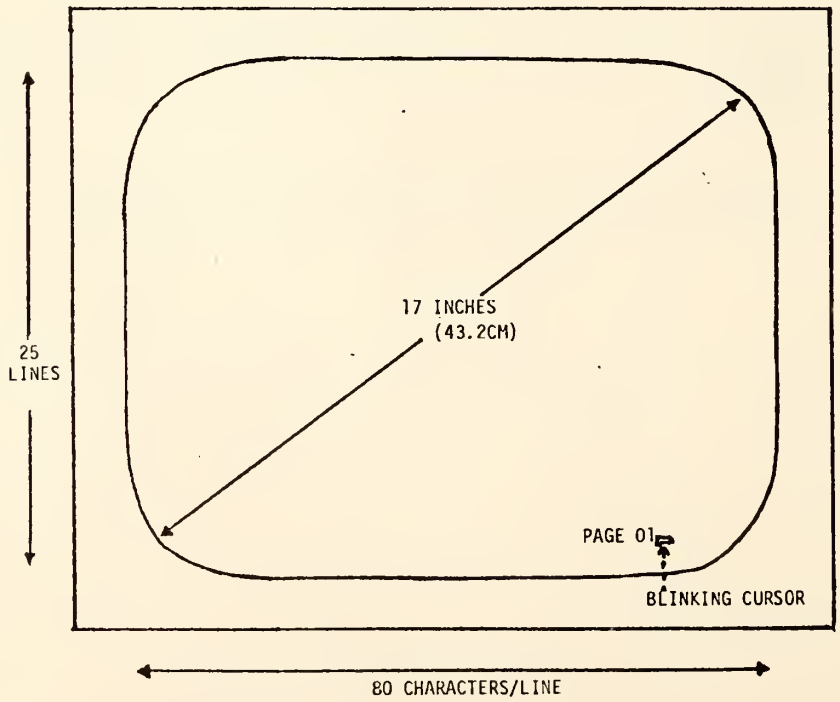


Figure 2-11

GDM CRT

SECTION C: The Graphic Display Module

EXPLANATION: The GDM consists of: a CRT for displaying of alphanumeric data and graphics, either separately or overlaid; CRT control knobs; and a Display Control Panel.

The Major features of the CRT are:

1) A 17 inch (43.2 cm.) diagonal black and white screen, capable of displaying 25 lines of alphanumeric data with 80 characters/line or a full screen graphic(s).

2) A "cursor" shown as a flickering segment of light "▭" that locates the next alphanumeric character or a point on a graphic.

3) A legend is displayed on lower left or right corner of screen whenever graphics are shown

4) Magnification of displayed image.

5) Movable field allows off centering of a graphic(s).

6) Performs like a 525 line TV picture screen (future application for displaying satellite pictures).

continued

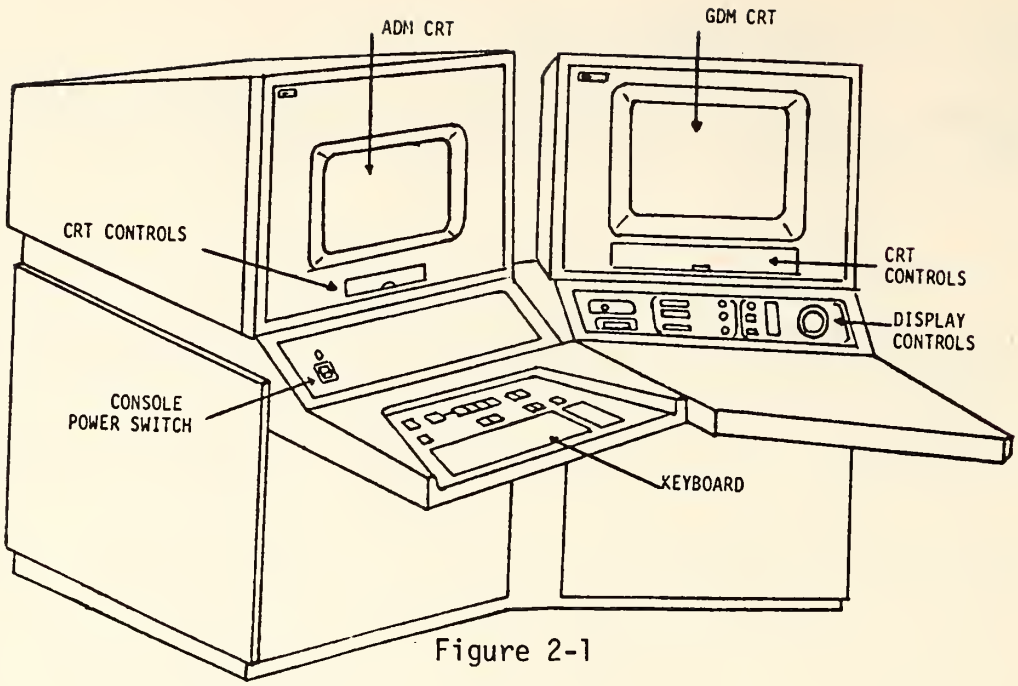


Figure 2-1

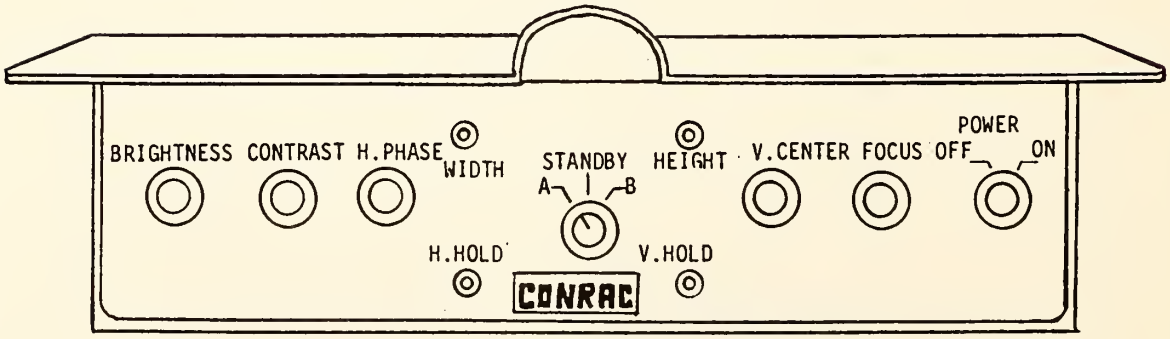


Figure 2-12

CRT Controls

The CRT controls (Figure 2-1) are found behind a hinged door directly below the screen. Figure 2-12 depicts these controls with the door in the open position.

CONTROLS	FUNCTION
Brightness	Adjusts brightness of CRT
Contrast	Adjusts the light/dark ratio of the CRT
Horizontal Phase	Moves the picture in a horizontal direction
Width	Moves width of picture within a predefined range
Horizontal Hold	Used to stabilize CRT picture if it becomes misaligned in a horizontal direction
Mode (3-position) Switch	Selects types of input into the CRT
	"A" position; input high resolution (1024 x 768 pixels) picture from Raster Scan Generator.
	"B" position; input is a standard 525 line TV video picture.
	"Stand By" position: no input and screen will be blank
Vertical Hold	Used to stabilize the CRT picture if it becomes misaligned in the vertical direction.
Height	Adjusts the height of the picture within a predefined range.
Vertical Center	Centers the picture along vertical axis.
Focus	Adjusts the clarity of the picture
Power	Controls the AC power to the GDM.

continued

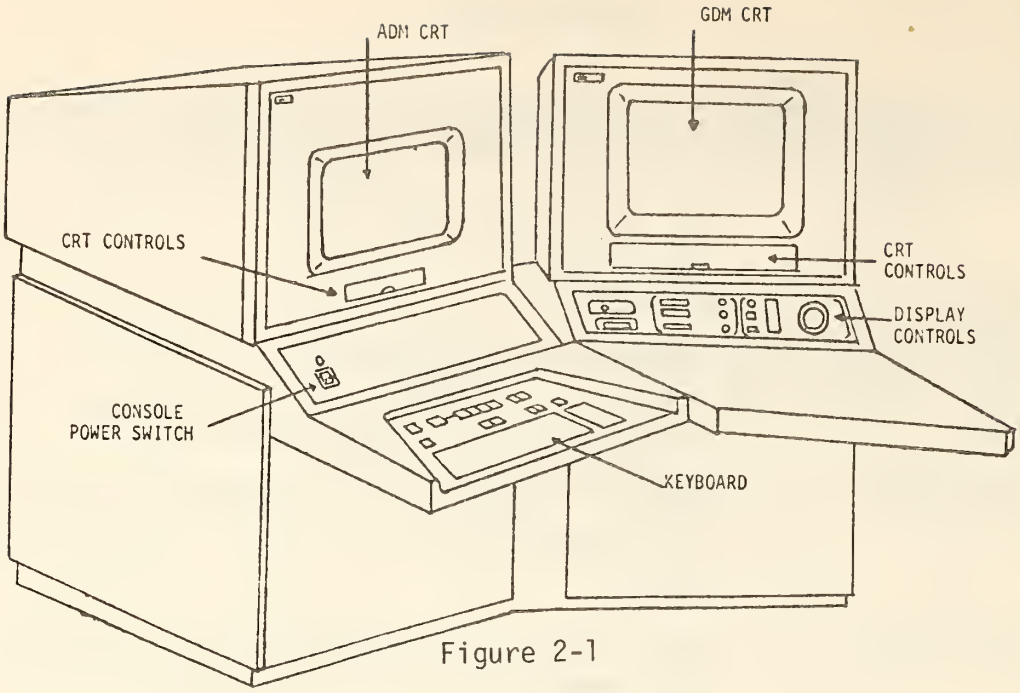


Figure 2-1

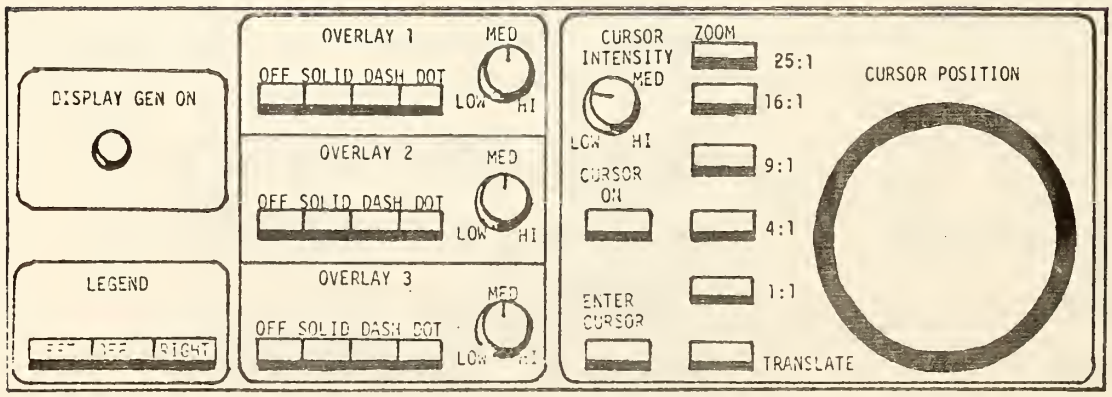


Figure 2-13

Display Control Panel

The third area of the GDM is the Display Control Panel (Figure 2-1). The controls are used to manipulate displayed graphics. Figure 2-13 shows the control panel and is followed by a discussion of each feature on the panel.

CONTROL	FUNCTION
Display Gen On	Light glows when graphic generator is operating; depress light button briefly to clear screen of a graphic ("push to reset") that won't clear by normal means
Legend	Displays legend on right or left corner of screen or removes legend from the screen
Overlay 1 (2 or 3)	TEXTURE BUTTONS - Allows each of three graphic fields to be shown in solid, dashed, or dotted contours. "OFF" surpresses the individual graphic from the screen INTENSITY KNOBS - Brightens or darkens contours for each of 3 graphic fields
Cursor Intensity	Varies brightness of cursor
Cursor On	Turns cursor on or off
Enter Cursor	Future application
Zoom	Area ratios are 1:1. 4:1. 9:1. 16:1, and 25:1 (e.g., n=m, where m=original size of graphic, n=number of times displayed graphic(s) enlarged from the original graphic size) Amount of data displayed increases with increase in area ratio through ratio 16:1; ratio 25:1 displays same amount of data as the 16:1 ratio
Translate	Shifts graphic automatically to center cursor on the screen.
Cursor Position	Trackball for manual positioning of cursor to any point on the screen

TOPIC 2 COMMUNICATIONS/COMPUTER MODULE (CCM)

INTRODUCTION

The control units for the AFOS system are housed in a metal rack(s). A rack contains: a minicomputer (Section A); communications equipment (Section B); data stored disks and diskettes (Sections C and D); backup switches for degraded mode of operation (Section E); and power supply units (Sections B and F). This rack(s) is called the Communications/ Computer Module (CCM). One rack is needed for each minicomputer an office has.

The console operator and the Electronics Technician use the CCM for recognition of system failures (Chapter 4) and handling the disk(s) and/ or diskettes (Sections C and D).

Figure 2-14 shows the CCM. Each component is discussed in the following material.

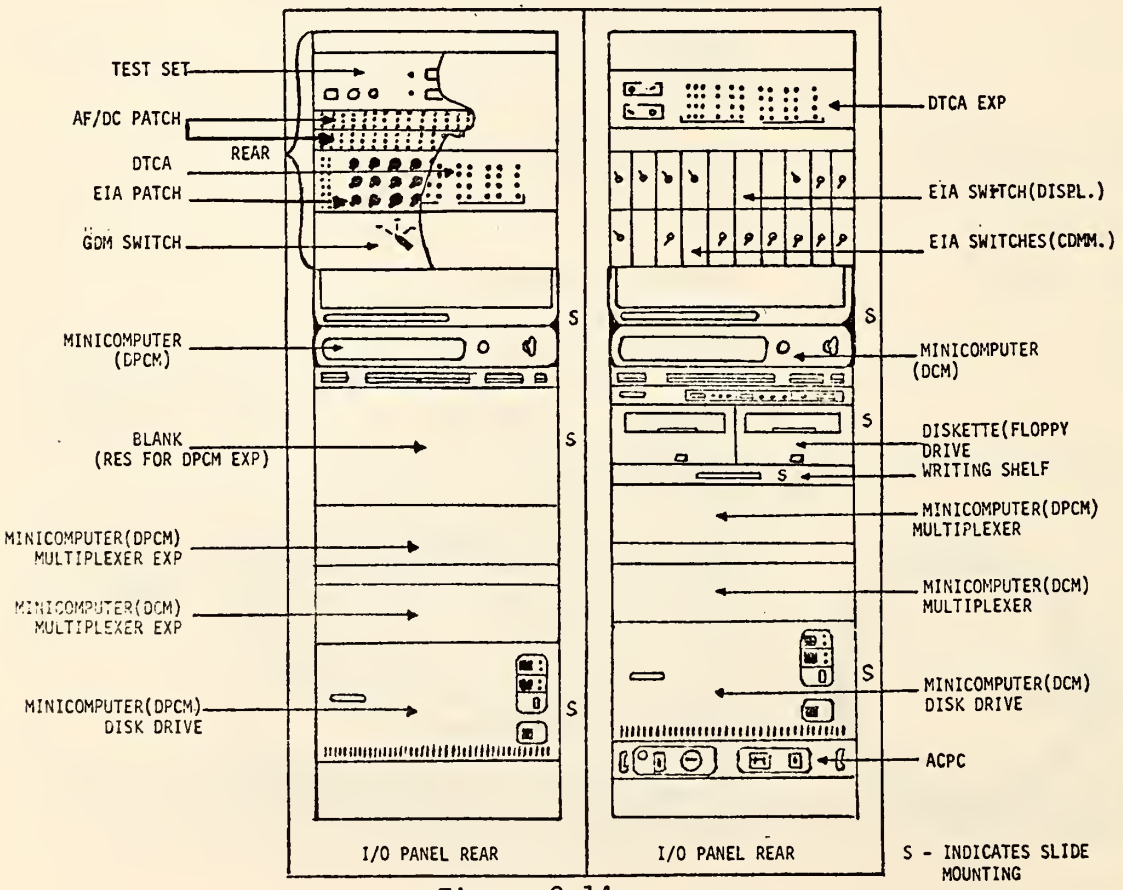


Figure 2-14

CCM

SECTION A: The S/230 Eclipse Minicomputer

EXPLANATION: The functions of the switches located on the front of the computer are discussed. Refer to Figure 2-14 for location of the minicomputer in the CCM.

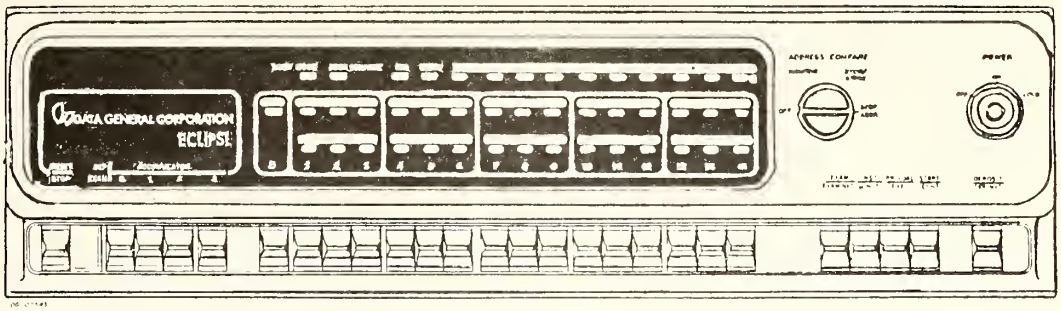


Figure 2-15
Eclipse Computer Console

CONSOLE SWITCHES	FUNCTION
POWER SWITCH	Controls power to Eclipse minicomputer. Renders other console switches inoperable when switch is in LOCK position. Key can be removed in LOCK position.
ADDRESS COMPARE SWITCH	Used only when making program changes. Will not be used by operators.
DATA SWITCHES	These are located along the bottom of the console. First five and last five are function switches. Middle 16 are address, instruction, and data entry switches.

AFOS operators will use these switches to boot or reboot the system when program or hardware problems have caused a system failure. Procedures for these operations will be described in later chapter of this Training Guide.

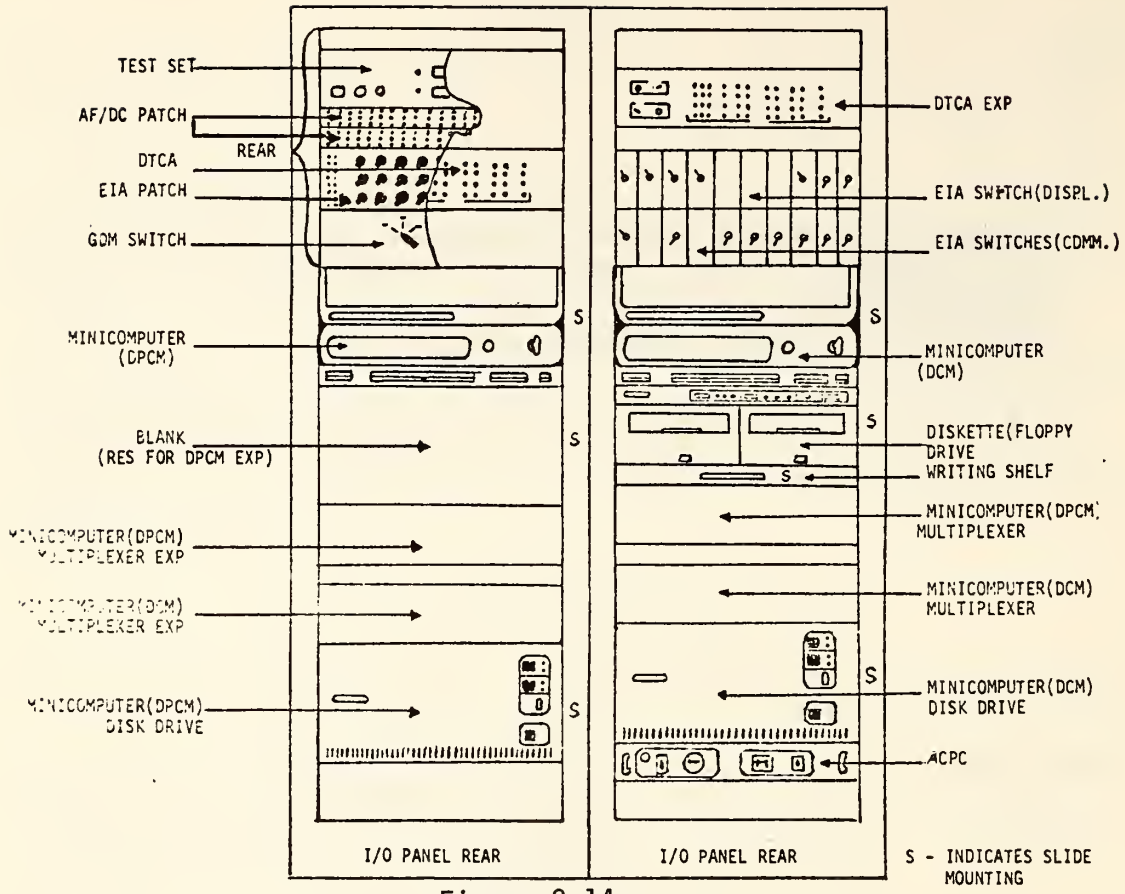

TEST SET
AF/DC PATCH
REAR
DTCA
EIA PATCH
GDM SWITCH
MINICOMPUTER (DPCM)
BLANK (RES FOR DPCM EXP)
MINICOMPUTER(DPCM) MULTIPLEXER EXP
MINICOMPUTER(DCM) MULTIPLEXER EXP
MINICOMPUTER(DPCM) DISK DRIVE
S
S
S
I/O PANEL REAR
DTCA EXP
EIA SWITCH(DISPL.)
EIA SWITCHES(CDMM.)
S
MINICOMPUTER (DCM)
S
DISKETTE(FLOPPY DRIVE
S
WRITING SHELF
MINICOMPUTER(DPCM) MULTIPLEXER
MINICOMPUTER(DCM) MULTIPLEXER
S
MINICOMPUTER(DCM) DISK DRIVE
ACPC
I/O PANEL REAR
S - INDICATES SLIDE MOUNTING

Figure 2-14

SECTION B: The Data Transfer and Control Assembly (DTCA)

EXPLANATION: The main components of the DTCA will be discussed.

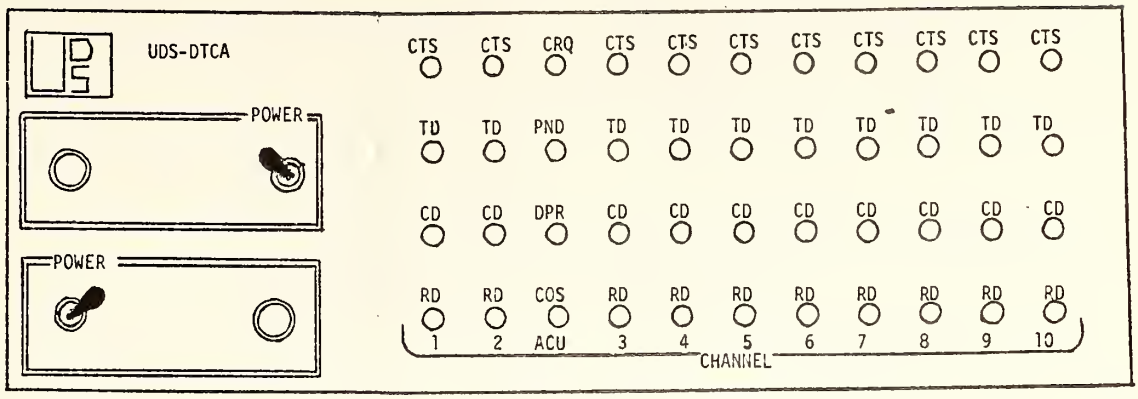


Figure 2-16
DTCA

The Data Transfer and Control Assembly (DTCA) assembly allows the CCM to receive and transmit data at both high and low speeds.

The power supply switches are located on the left side of the DTCA (Figure 2-16). Both supplies are switched to the "ON" position. However, one is designated as the primary power supply. The other supply is a backup unit. This setup insures a continuous supply of power to the unit. If one source fails, the other automatically takes over control.

The front panel lights are positioned next to the power supplies. These lights indicate the status of various components housed in the DTCA. Interpretation will not be an operator function.

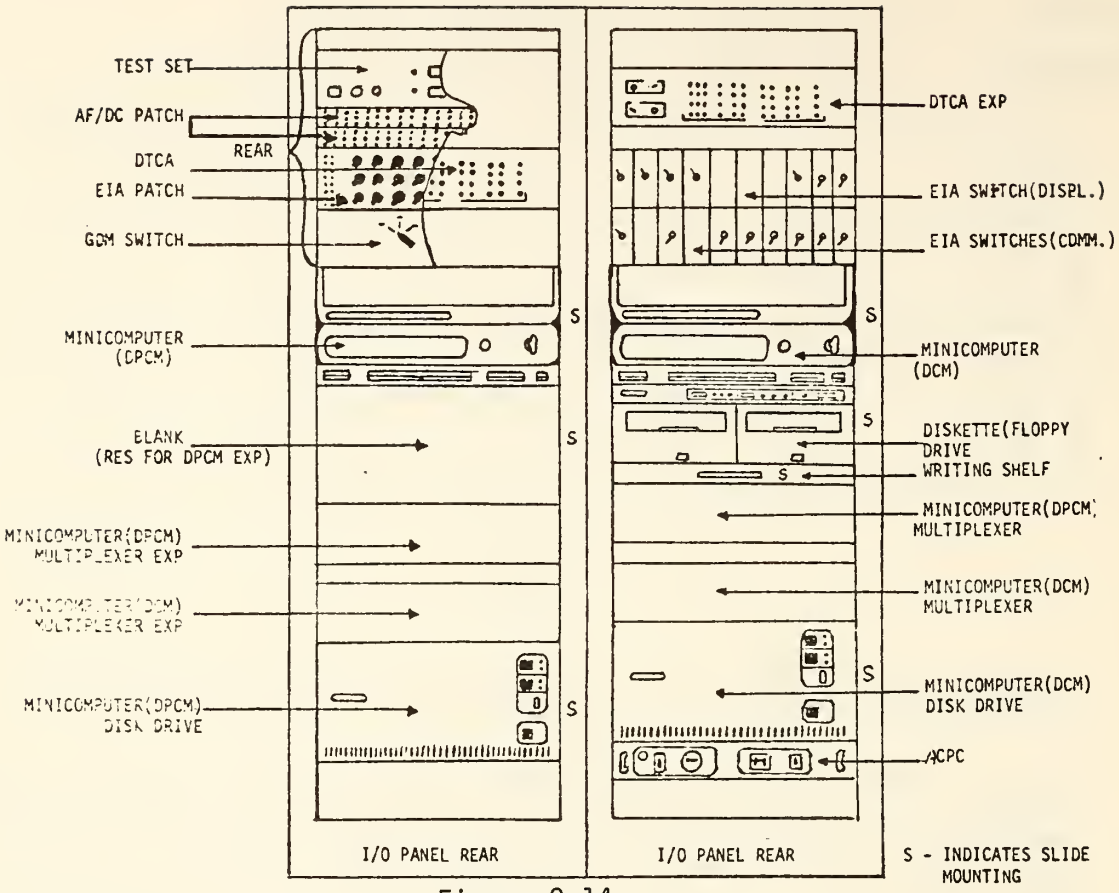

TEST SET
AF/DC PATCH
REAR
DTCA
EIA PATCH
GDM SWITCH
MINICOMPUTER (DPCM)
BLANK (RES FOR DPCM EXP)
MINICOMPUTER(DPCM) MULTIPLEXER EXP
MINICOMPUTER(DCM) MULTIPLEXER EXP
MINICOMPUTER(DPCM) DISK DRIVE
S
S
S
I/O PANEL REAR
DTCA EXP
EIA SWITCH(DISPL.)
EIA SWITCHES(COMM.)
S
MINICOMPUTER (DCM)
S
DISKETTE(FLOPPY DRIVE
WRITING SHELF
S
MINICOMPUTER(DPCM) MULTIPLEXER
MINICOMPUTER(DCM) MULTIPLEXER
S
MINICOMPUTER(DCM) DISK DRIVE
ACPC
I/O PANEL REAR
S - INDICATES SLIDE MOUNTING

Figure 2-14

SECTION C: The Disk Storage System

EXPLANATION: This section describes the disk storage system and the handling of the disks.

The term DISK STORAGE SYSTEM refers to an assembly containing:

a disk drive,

a rigid magnetic platter that cannot be removed,

a removable magnetic platter housed in a plastic cartridge that can be removed by operators.

A two computer configuration has two disk storage systems.

A one Computer configuration has one disk storage system.

The disk drive is mounted on a sliding shelf near the bottom of the CCM (Figure 2-14).

These disks store:

Computer programs that direct the operation of the computer system.

Computer programs that direct the operation of the AFOS system.

Alphanumeric data and graphic data.

The operator's controls for the disk drive are located on the right side of the front panel.

continued

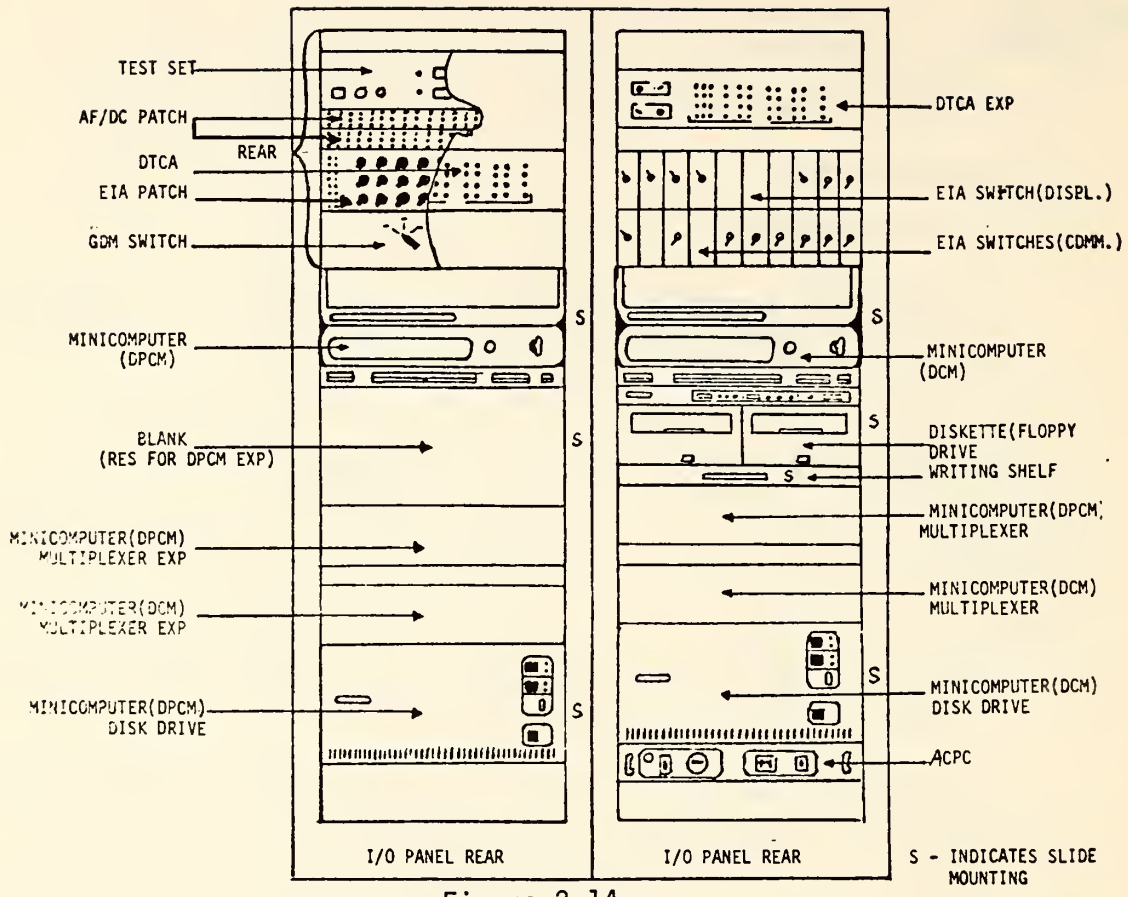

TEST SET
AF/DC PATCH
REAR
DTCA
EIA PATCH
GDM SWITCH
MINICOMPUTER (DPCM)
BLANK (RES FOR DPCM EXP)
MINICOMPUTER(DPCM) MULTIPLEXER EXP
MINICOMPUTER(DCM) MULTIPLEXER EXP
MINICOMPUTER(DPCM) DISK DRIVE
S
S
S
I/O PANEL REAR
DTCA EXP
EIA SWITCH(DISPL.)
EIA SWITCHES(COMM.)
MINICOMPUTER (DCM)
DISKETTE(FLOPPY DRIVE
WRITING SHELF
MINICOMPUTER(DPCM) MULTIPLEXER
MINICOMPUTER(DCM) MULTIPLEXER
MINICOMPUTER(DCM) DISK DRIVE
ACPC
S
S
S
S
I/O PANEL REAR
S - INDICATES SLIDE MOUNTING

Figure 2-14

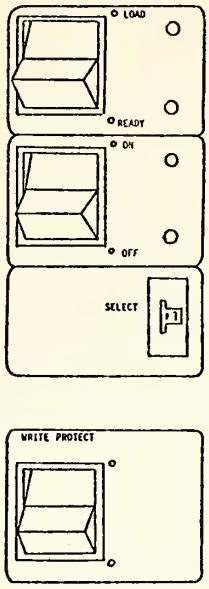


Figure 2-17
Disk Drive Controls

CONTROLS	FUNCTION
LOAD/READY (rocker switch)	LOAD POSITION stops the disk drive, LOAD LIGHT will glow when disk is stopped. READY POSITION starts the disk drive. READY LIGHT will glow when disk is online with the minicomputer.
ON/OFF* (rocker switch)	Power switch for disk drive ON LIGHT glows when power is on.
SELECT (thumbwheel switch)	Select unit number for the drive
WRITE PROTECT (rocker switch)	On position prevents writing on disk. OFF position allows normal write operation.

*Always make sure the load/ready switch is in LOAD position before power switch OFF.

continued

Instructions for handling disks:

1. Turn power on. Drive will not slide out of cabinet otherwise.

2. Press "LOAD" and wait for indicator light, before removing or inserting any disk cartridges.

3. Release the front panel latches at left and right edge.

4. Slide out drive unit until it stops.

5. Remove the dust cover, if present, from the circular cavity.

6. Remove the old disk cartridge, if present, as follows:

   a. Push its thumb latch to the left.

   b. Lift the handle straight up while holding the latch left.

   c. Use the handle now to lift the whole cartridge up and out of the drive cavity.

   d. Place the cartridge into its dust cover base.

   e. Lower the handle flat and release the thumb latch, to lock the cartridge to the base for carrying and storage.

   f. If not mounting a new cartridge, place a spare dust cover in the drive cavity and close and re-latch the drive.

continued

7. Install the new disk cartridge, as follows:

   a. Push its thumb latch plate to the left.

   b. Lift the handle straight up while holding the latch left.

   c. Use the handle now to lift the whole cartridge up and out of its dust cover base.

   d. Insert the cartridge into the drive cavity and seat it.

   e. Lower the handle flat and release the thumb latch, to lock the cartridge to the drive spindle for operation.

   f. Insert the dust cover into the cavity over the cartridge.

8. Press "READY" and wait for indicator light.*

   * Note: If there is a substantial temperature difference between the cartridge disk and the drive, the READY light may not illuminate for 5 to 10 minutes. This is no cause for concern, but will merely increase start-up time. To expedite the start-up procedure, it is good practice to store the cartridge in the computer room.

SECTION D: The Diskette Archival System

EXPLANATION: A diskette is a small flexible magnetic disk sealed in a protective cover. The diskette is also called a "floppy disk" or simply a "floppy".

Each computer has a set of two independent diskette drives located just under the minicomputer in a one minicomputer configuration. The two minicomputer configuration has the diskette drives placed just below the minicomputer in the right hand rack (Figure 2-14).

Diskette storage is designed to store locally generated data and products either temporarily or permanently (archived).

The operator controls are above the door to the diskette drive.

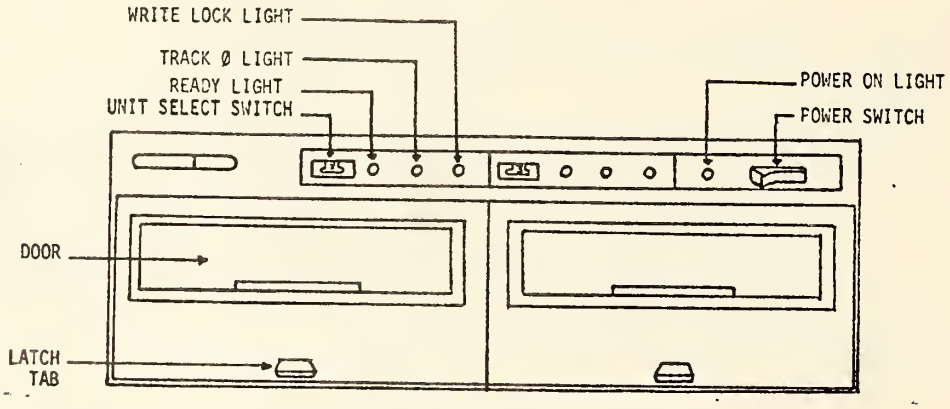


Figure 2-18
Diskette Drive

The power light is located next to the power switch. This light will glow when the power switch is in the "ON" position. A four position thumbnail switch sets the logical unit number for the drive. Also there are three lights that indicate a particular status of the drive.

continued

STATUS LIGHTS	MEANING WHEN GLOWING
READY	The drive is in a ready mode.
TRACK Ø	The read/write head in drive is positioned at "TRACK Ø" on the floppy.
WRITE LOCK	The floppy cannot be written on by the operator.

Instructions for handling diskettes

1. Ensure power on Observe indicator light on.
2. Open drive door by pressing latch tab below door.
3. Remove old diskette, if present, and replace it in storage envelope.
4. Diskette will only record data when the "write protect" hole is covered on both sides by a piece of opaque tape. If hole is not covered the diskette can only readout data.
5. Slide the new diskette into the drive slot, with the envelope label up and out towards you.
6. Close the drive door. When latched the "READY" and "TRACK O" lights will glow. If write-protect hole is taped, the "WRITE LOCK" light will also glow.
7. Diskette is now ready for operation.

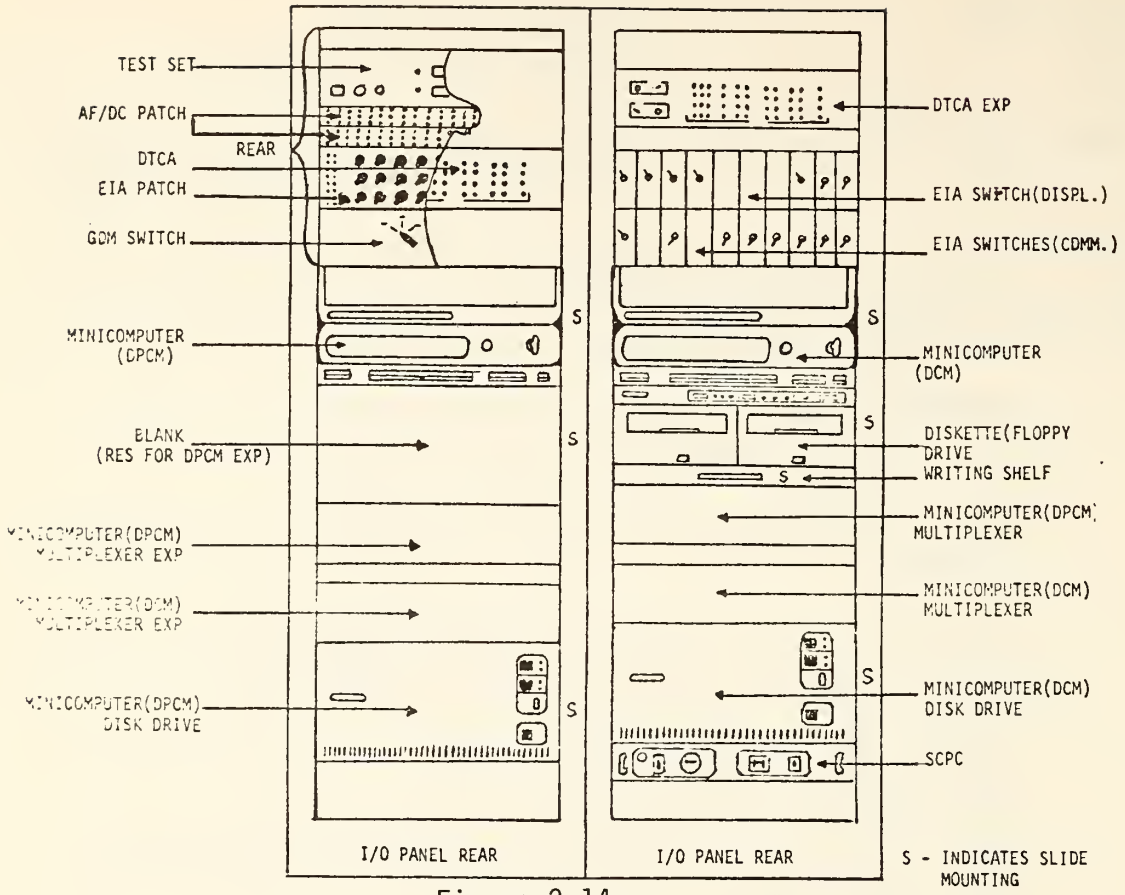


Figure 2-14

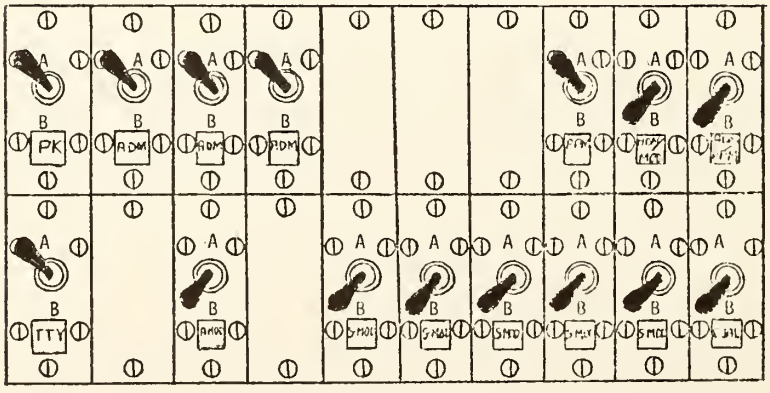


Figure 2-19

Typical Two Minicomputer Configuration

SECTION E: Electronic Industries Association (EIA) Switch Panel

EXPLANATION: The EIA Switch Panel is your primary area for converting to a degraded mode of operation

Two types of switch arrangements are possible for the EIA switch panel, one for double minicomputer configuration and one for single minicomputer configuration. Figures 2-19 and 2-20 depict each type of the above mentioned configurations.

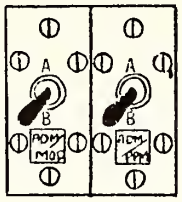


Figure 2-20
Single Minicomputer Configuration

In a double minicomputer configuration there are up to twenty EIA switches possible. These are used to provide backup modes of operation by switching communication functions from a malfunctioning minicomputer to the other, still operational, minicomputer.

In a single minicomputer configuration there are only two switches. These provide capability of operating in a degraded mode in case the minicomputer fails.

Operators use of these switches will be explained in Topics dealing with a recovery from system failures.

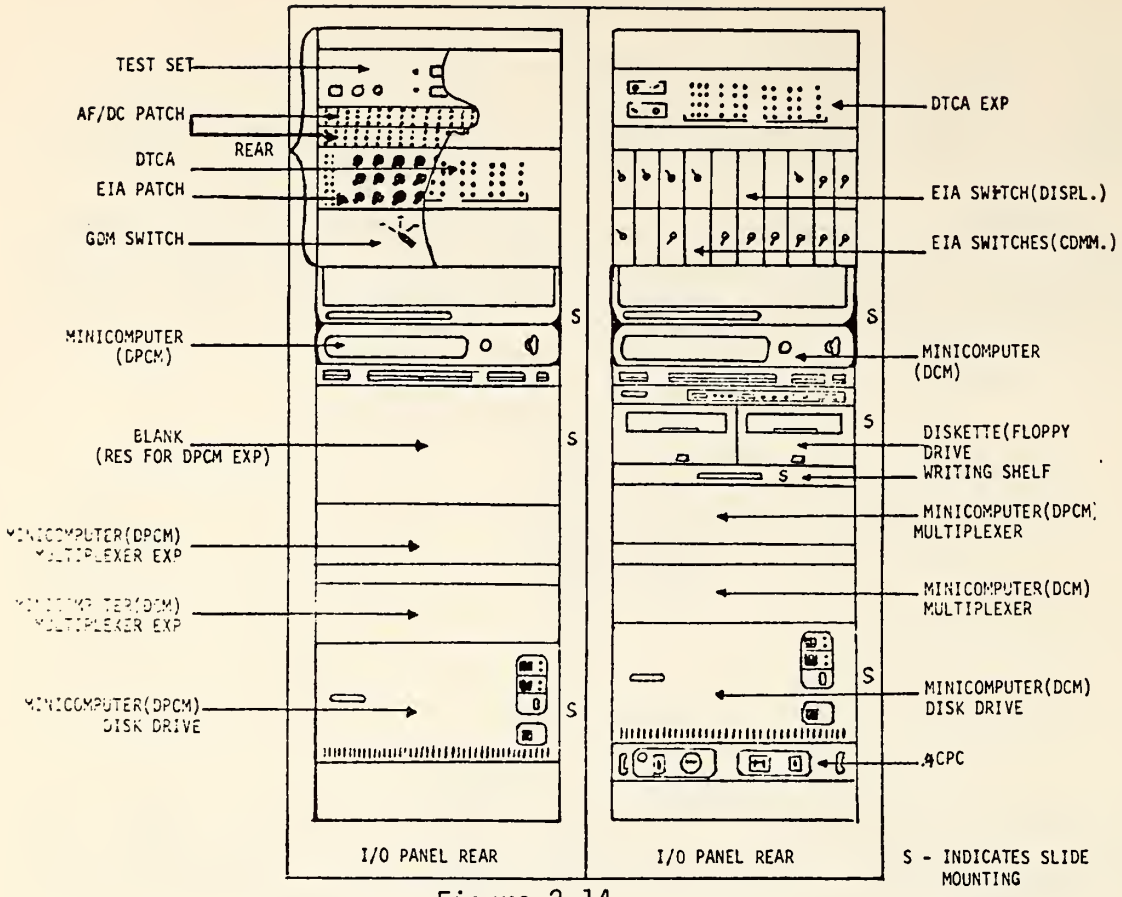

TEST SET
AF/DC PATCH
REAR
DTCA
EIA PATCH
GDM SWITCH
MINICOMPUTER (DPCM)
BLANK (RES FOR DPCM EXP)
MINICOMPUTER(DPCM) MULTIPLEXER EXP
MINICOMPUTER(DCM) MULTIPLEXER EXP
MINICOMPUTER(DPCM) DISK DRIVE
S
S
S
I/O PANEL REAR
DTCA EXP
EIA SWITCH(DISPL.)
EIA SWITCHES(CDMM.)
MINICOMPUTER (DCM)
DISKETTE(FLOPPY DRIVE
WRITING SHELF
MINICOMPUTER(DPCM) MULTIPLEXER
MINICOMPUTER(DCM) MULTIPLEXER
MINICOMPUTER(DCM) DISK DRIVE
CPC
S
S
S
S
I/O PANEL REAR
S - INDICATES SLIDE MOUNTING

Figure 2-14

SECTION F: AC Power Control (ACPC) Unit for the CCM

EXPLANATION: The console operator may find it necessary, on occasion to power down the CCM. Part of this procedure is to turn off the power supply to the CCM. The switch for this is the "MASTER RACK POWER" switch located at the bottom of the CCM rack directly below the disk drive (located in the rack on your right facing the CCM for a two minicomputer configuration). Refer to Figure 2-14. Figure 2-21 shows the unit in more detail.

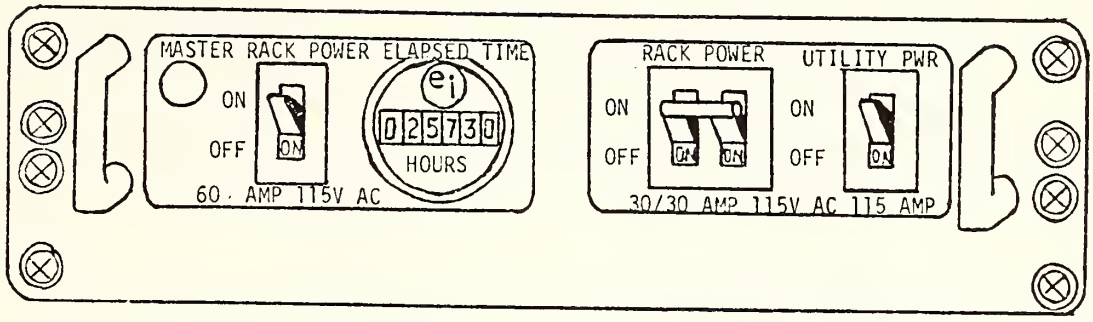


Figure 2-21
ACPC Unit

When master switch located on the left side of the unit is off it automatically disables the rack power and utility power switches These two switches will not normally be handled by the operator.

TOPIC 3: PRINTER/PLOTTER MODULE (PPM) AND KEYBOARD/PRINTER (KB/P)

SECTION A: The Printer/Plotter Module (PPM)

EXPLANATION: The physical characteristics of the PPM are discussed in this section.

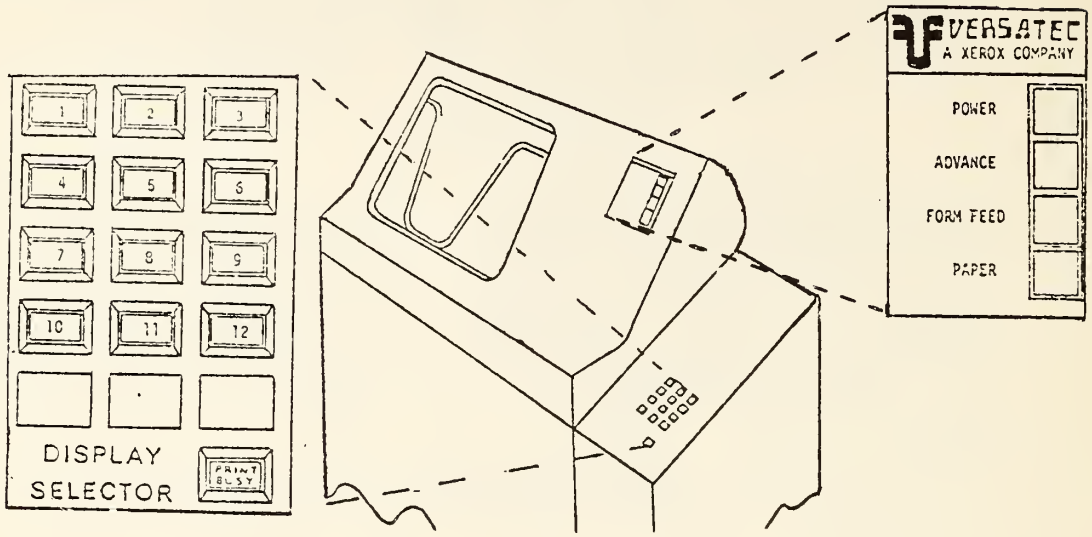


Figure 2-22
The PPM

The PPM will produce a copy of displayed data in about 10 seconds. For graphic prints the paper will automatically advance so the copy can be torn off.

Data displayed on an ADM can be copied by striking the PRINT key on the ADM keyboard

Data displayed on the GDM can be copied by pushing the DISPLAY SELECTOR button corresponding to the GDM display. The button will light and stay lit until the copy is made. See paper control buttons upper right of Figure 2 22.

Function of Controls

POWER	Turns power off or on
ADVANCE	Paper advances as long as button is held down
FORM FEED	Advances paper one page length
PAPER	Lights to indicate PPM is out of paper

SECTION B: Keyboard/Printer (KB/P)

EXPLANATION: The KB/P allows the operator direct communication with the minicomputer. It is essentially a typewriter with special function keys added.

The keyboard differs from the ADM keyboard in location of some of the keys and in the special function keys. Although, both allow communication with the minicomputer, the ADM keyboard interfaces with the AFOS program commands, whereas, the KBP interfaces with the operating system program commands.

The KB/P consists of three basic parts: 1) a printer; 2) the operator's controls, and; 3) the keyboard (Figure 2-23).

The printer consists of essentially two parts, a printhead and paper. A brief description of these parts and some other characteristics of the printer follows:

PRINTHEAD	Contains the character set for the KB/P and prints the characters typed by the operator.
PAPER	KB/P uses fanfold industry standard pinfeed paper.
AUDIBLE "CARRIAGE-RIGHT"	Sounds when printhead reaches the TONE end of line; character position 126 of a maximum 128 characters/line.
VIEW PRINT	Automatic feature which moves the printhead clear of the printed text to allow the operator to see the text. Printhead returns to the character position after the last character printed when typing resumes.

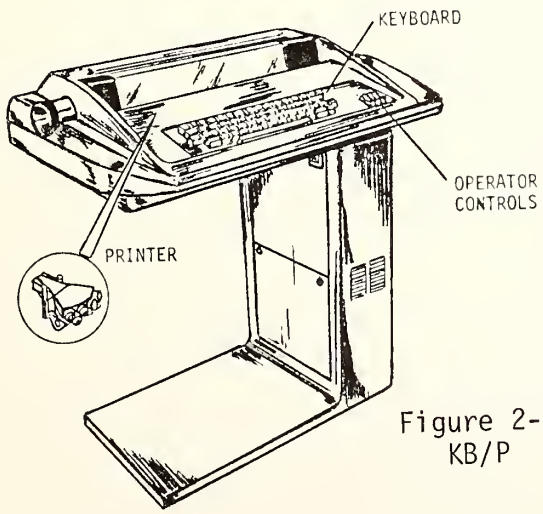


Figure 2-23
KB/P

continued

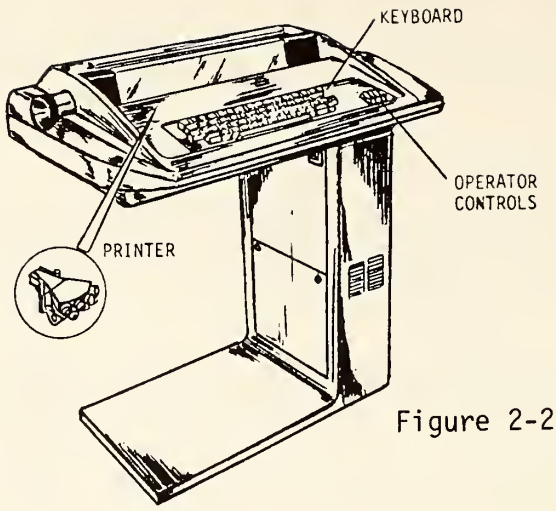


Figure 2-23

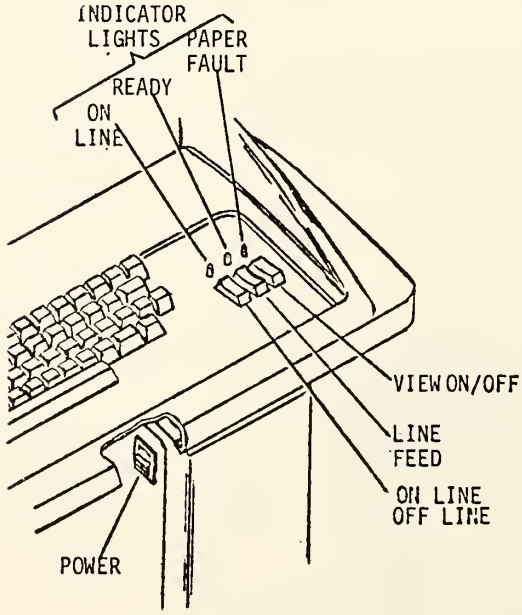


Figure 2-24

Operator Controls

Operator Controls consist of three switches and three lights located to the right of the keyboard. The switches have special functions as described below:

POWER SWITCH	Turns power on (up position) and off (down position). Ready light glows when power is on.
ON/OFF LINE	ON LINE - Terminal is placed "on-line" with the computer. Information entered is printed and transmitted to the computer. ON-LINE indicator light glows. OFF LINE - The terminal is placed "off-line" from the computer. Information entered is printed but NOT transmitted to the computer.
LINE FEED	Used to advance paper. Depressing the edge nearest the light advances paper one space. Depressing edge nearest the operator causes paper to advance continuously until switch is released.
VIEW	VIEW ON - Moves printhead clear of print during lapses in typing. VIEW OFF - Printhead does not move clear of print.
INDICATOR LIGHTS	LEFT - Indicates terminal is on line. MIDDLE - Indicates power is on. RIGHT Indicates printer is out of paper. Terminal goes off line. Data transmitted subsequently is lost.

continued

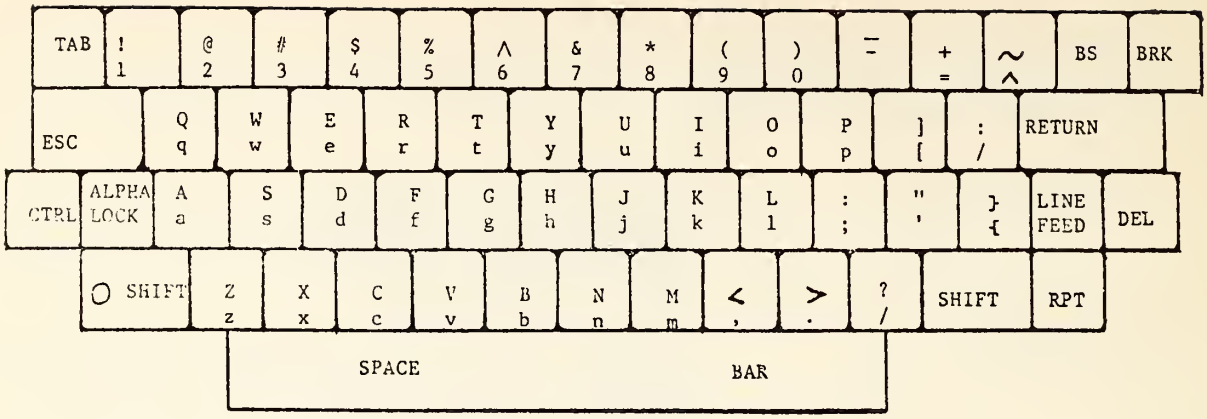


Figure 2-25
KB/P Keyboard

The special function keys are

TAB	Not used
BS (back space)	Not used.
BRK (break)	Not used.
ESC (escape)	This key will not normally be used by AFOS operators.
RETURN	Used to enter a command to the computer. The printhead returns to the leftmost character position; the paper does not advance
CTRL (control)	Used for terminating foreground/background programs. CTRL KEY depressed while striking another key.
ALPA LOCK	Locks shift key until depressed again.
LINE FEED	Advances the paper one line.
DEL (delete)	No effect during off-line operation. During on line operation. minicomputer deletes previous struck character. Printhead moves forward one character space.
RPT (repeat)	When this key and a character key are depressed simultaneously, the character is continuously generated until either key is released.

CHAPTER 3

AFOS DATA BASE OVERVIEW

AFOS DATA BASE OVERVIEW

INTRODUCTION

From the AFOS Newsletters, and other related sources, you probably have already formed a general impression as to what constitutes the AFOS data base.

First of all, data base in general, is defined as:

> The set of information, or data, on which operations and conclusions are based.

In AFOS, data base is that section of your mass data storage where AFOS products are stored and are subject to automatic purging.

The AFOS data base will include products (forecast, surface observations, graphics, etc.) that are used routinely by the operator to perform the daily mission.

All AFOS products (observations, forecast, warning products, etc.) have an assigned seven to nine character product identifier. The assigned product identifier is used for transmission, storage, and display of the product,and is also the foundation on which the data base is structured.

The format of the AFOS product identifier is CCCNNNXXX. The three elements of the product identifier identify each AFOS product. Specific examples and use of the product identifier will be discussed in this chapter.

At each site, the data base includes inventory lists of nodes, categories, etc. The operator may retrieve these lists when needed.

For those products that are not stored in your local data base, request/reply may be used to retrieve the product. Request/reply will be discussed in detail in a later chapter.

AFOS DATA BASE OVERVIEW

TOPIC 1: STORAGE OF DATA BASE PRODUCTS

SECTION A: The Product Identifier (CCCNNNXXX)

EXPLANATION: Data sent on the NDC is examined by each node and then forwarded on to the next node as discussed in Chapter 1. These data are generally in the form of products. The computer at each node does not examine the entire product to see if it should be stored. That would be inefficient.

Each product sent through the AFOS circuit has a unique identifier called the Product Identifier. The computer uses this identifier to determine if the product is to be stored at that node. This product identifier has a twelve character format of CCCNNNXXX.VV. Normally the .VV will not be used.

CCC (the NODE IDENTIFIER)* identifies the NDC node that entered the product onto the NDC.

NNN (the PRODUCT CATEGORY) identifies the type of product entered onto the NDC.

XXX (the PRODUCT DESIGNATOR)# identifies the specific product within the given Product Category (NNN).

.VV (the VERSION NUMBER) keeps track of the number of versions of each CCCNNNXXX. This number is usually internal in the computer in hexidecimal form. Its use will be explained when needed.

Presented below are three specific examples of AFOS CCCNNNXXX identifiers and a description of the products they represent.

1. MEMSAOBNA

CCC	NNN	XXX
MEM	SAO	BNA

This product is a surface observation (SAO) for Nashville, Tennessee (BNA) issued by the Nashville Weather Service Office but entered on the NDC through the Memphis Forecast Office (MEM).

2. SDFSFPKY

CCC	NNN	XXX
SDF	SFP	KY

This product is a State Forecast (SFP) for Kentucky (KY) by the Louisville Forecast Office (SDF).

continued

3. FTWSIGA

CCC	NNN	XXX
FTW	SIG	A

This product is Sigmet (SIG) Alpha (A) entered on the NDC by the Fort Worth Forecast Office (FTW).

* The CCC may not be a node identifier when a collective is requested to display a group of specific products.

The XXX is a three character identifier, however, in some cases a single character or two characters are used with blank characters filling the remaining spaces.

SECTION B: The Node Identifier (CCC)

EXPLANATION: The node identifier was discussed in the Communications Chapter. For purposes of illustration, think of the node as a large room filled with file cabinets. This room can store all the information created from the node and its corresponding SDC. The node used in the illustration is Memphis.

CCC

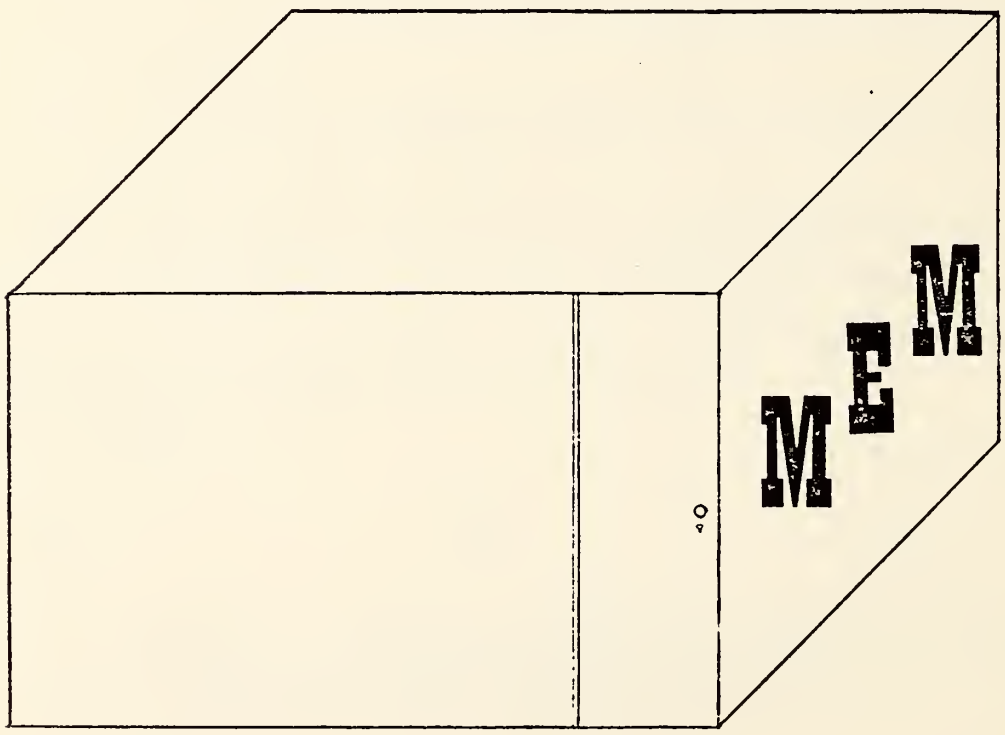


Figure 3-1

Node Identifier

Using the MEM node identifier gives access to the room filled with file cabinets.

SECTION C: The Category Inventory List (CIL)

EXPLANATION: The CIL is a list of all the categories of products that are issued by NWS offices. The NNN can be thought of as a group of file cabinets within the large room. This is illustrated in Figure 3-2.

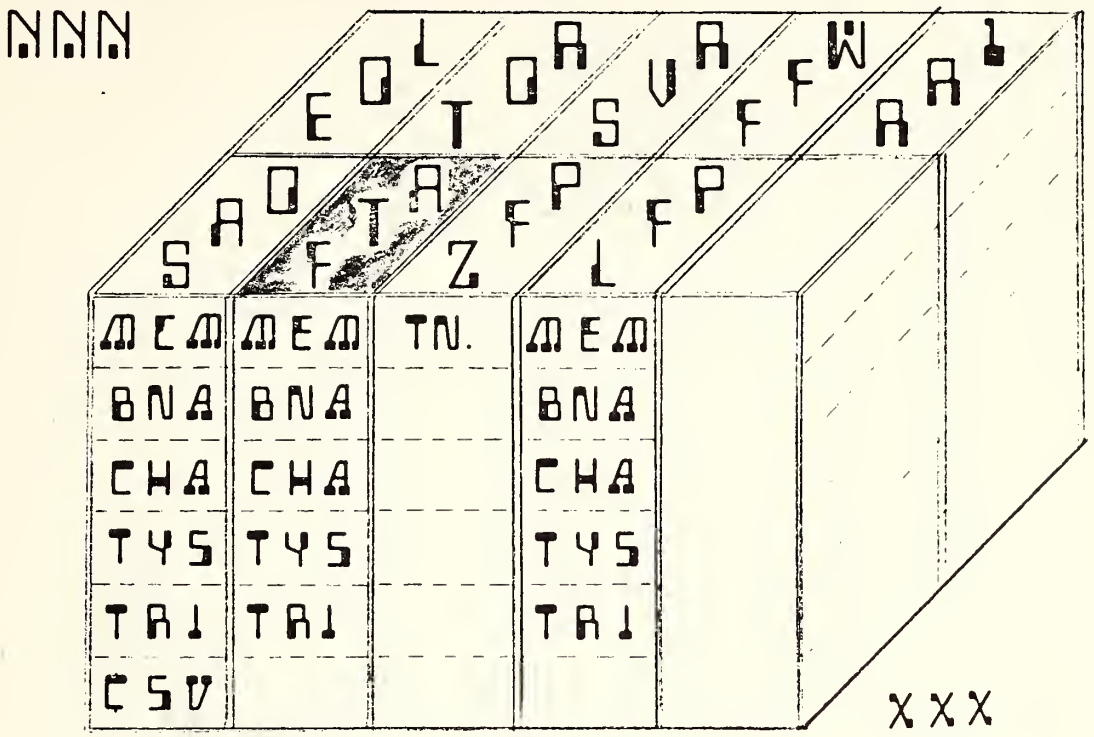


Figure 3-2

Product Category

Using the FTA product category gives access to the FTA file cabinet in the MEM storeroom.

Note: There are categories (NNNs) that MEM might not ever use, i.e., SAB (Snow Avalanche Bulletin), hence this category would appear on the CIL but not be used.

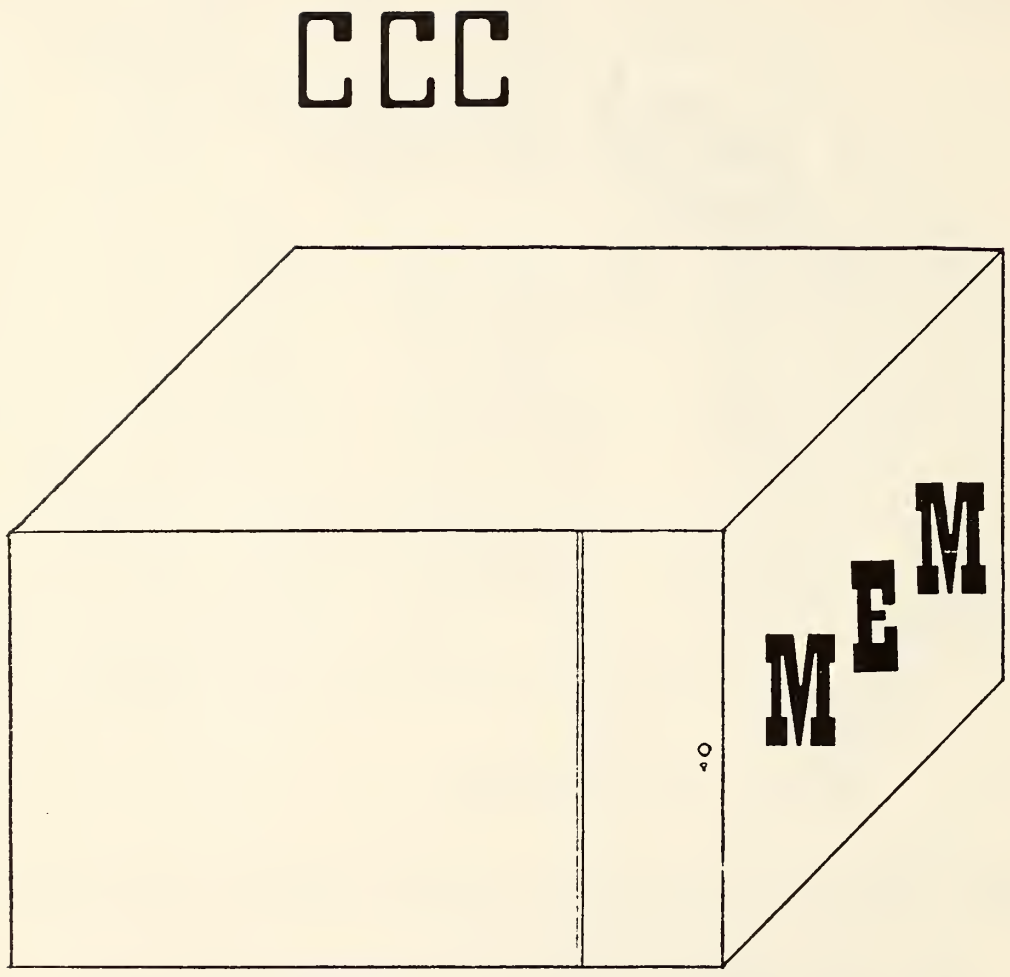


Figure 3-1

Node Identifier

SECTION D: The Product Inventory List (PIL)

EXPLANATION: The PIL is the final subdivision of the Product Indentifier. It delineates a specific product within a particular category. The PIL can be thought of as a drawer within a file cabinet. This is illustrated in Figure 3-3.

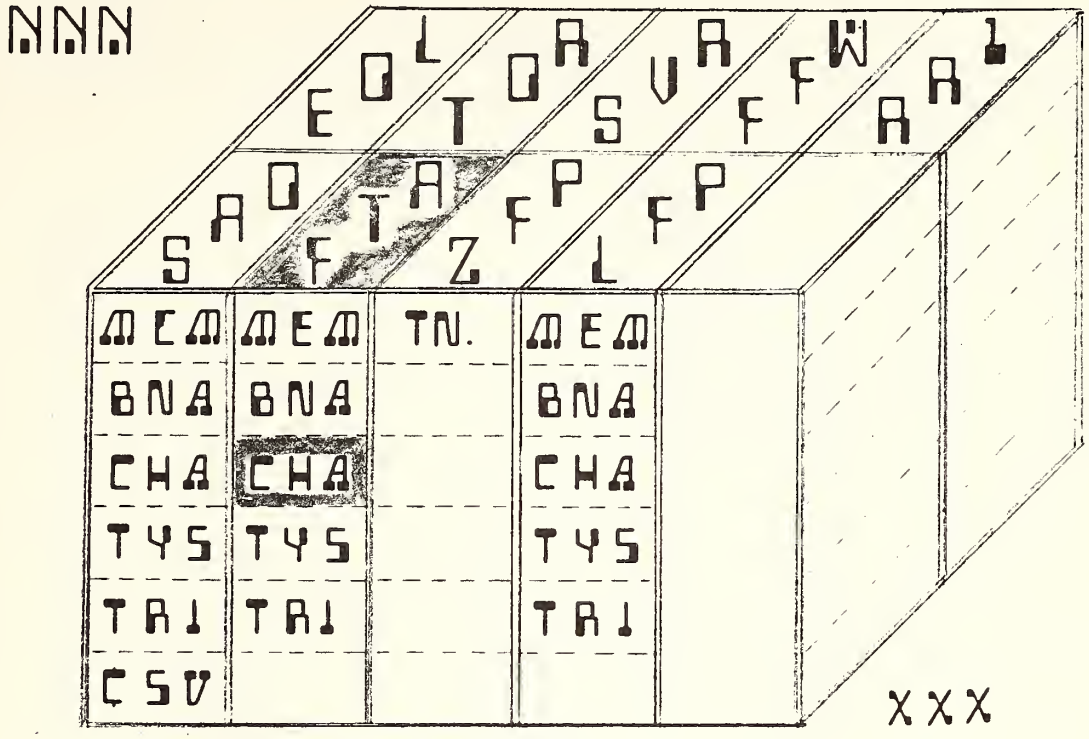


Figure 3-3

Product Designator

Using the CHA product designator gives access to the CHA drawer of the FTA cabinet in the MEM storeroom.

There is one more breakdown which specifies a single product. The PIL specifies a particular product; however, the computer upon direction stores one or several versions of the particular product. The product by version number is the smallest division of a product identifier.

Using the version number command (explained in later chapters) allows the operator to examine an individual product in the CHA drawer of the FTA cabinet in the MEM storeroom.

SECTION E: The Data Base

EXPLANATION: The data base at a particular node is composed of many of the storerooms illustrated in Sections B, C, and D. Some of these storerooms are larger than others because it is necessary to store more of a particular node's products than others. This would normally result from geographical proximity or from high frequency of use. For MEM (Figure 3-4), nodes such as SDF, STL, LIT, MSY, etc., would probably have larger rooms because of geographical position. Offices such as WBC and JFK could also have larger areas because of high frequency use of their products.

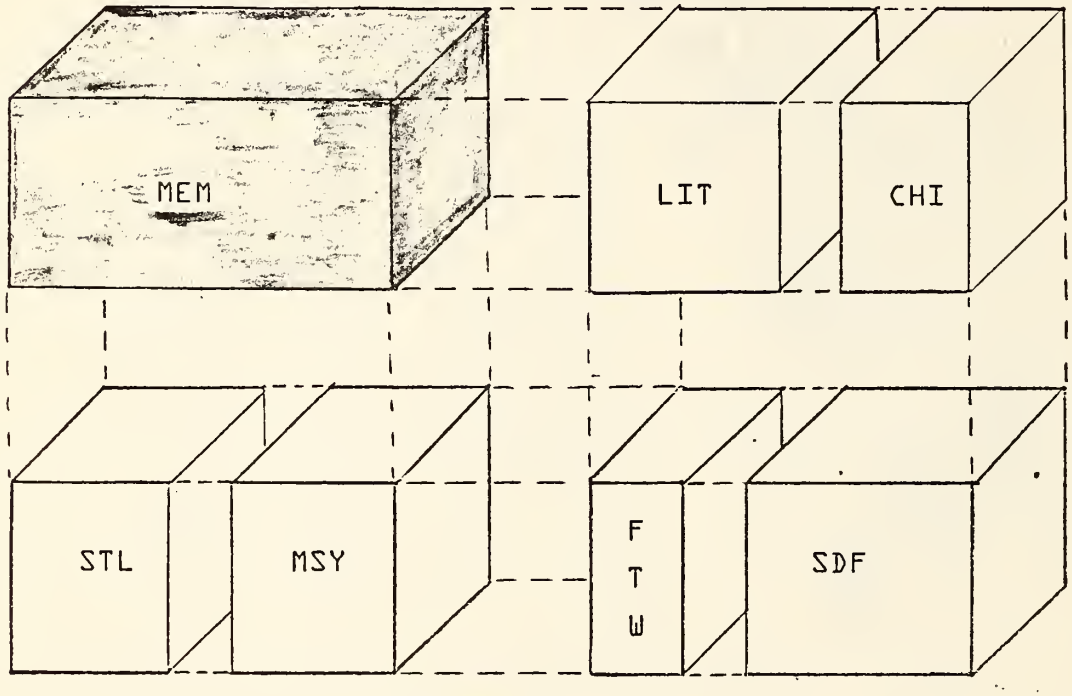


Figure 3-4

Data Base

This figure illustrates a possible data base structure of WSFO MEM.

SECTION F: SDC and NDC Node Data Storage Relationship

EXPLANATION: This section describes how data flows between NDC and SDC nodes.

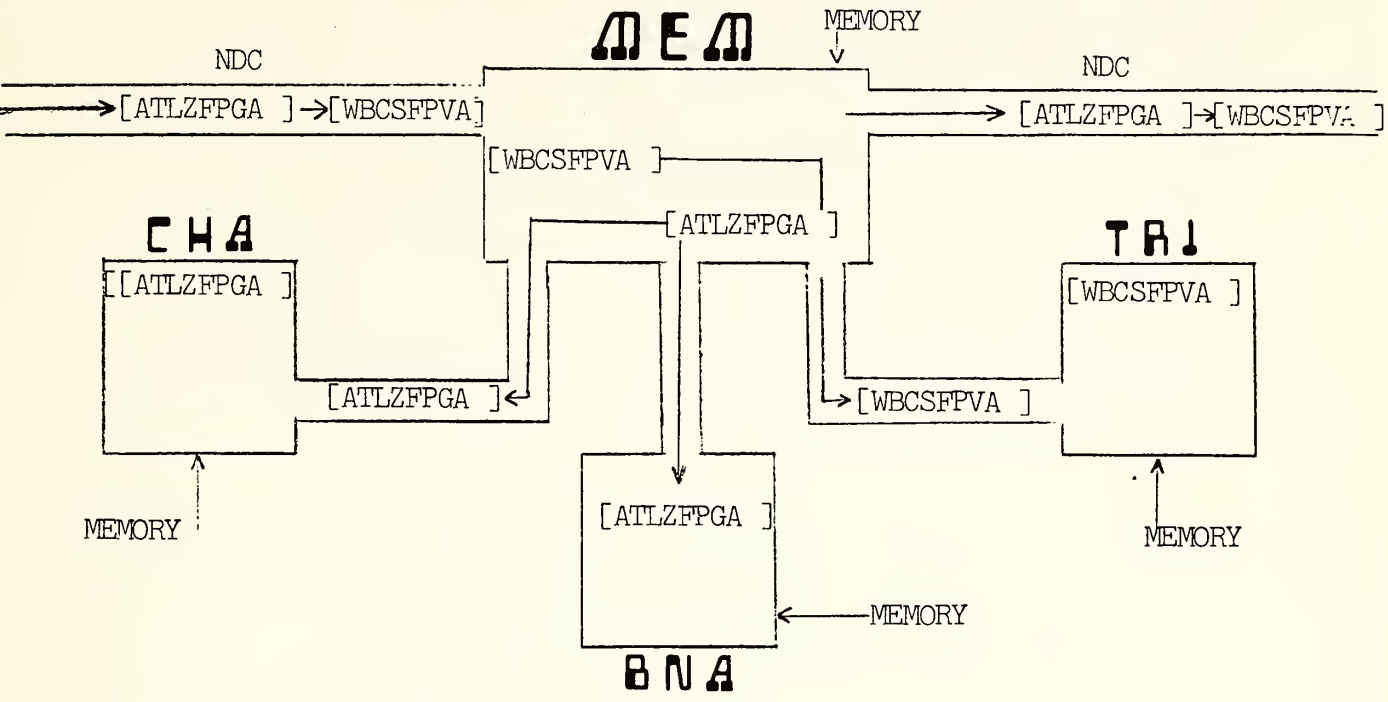


Figure 3-5

Data Flow

Data that travels on the SDCs is a subset of the data that is sent over the NDC. Only if the NDC node office (a WSFO or national center) stores a product in its local data base is that product available to the SDCs connected to the node. If the NDC node has not flagged the product for its own local storage then that product is passed along the NDC without forwarding it on the SDCs. Naturally, all products from the SDCs are forwarded on the NDC, whether the NDC node office stores them or not.

TOPIC 2: DATA BASE STORAGE ON DISK

SECTION A: The AFOS Disk

EXPLANATION: This section (1) defines a disk, (2) disk pack, (3) identifies the types of information that are stored on disk, (4) defines the difference between "data base" information and the rest of the information on disk, (5) looks at the implications of losing the service of one of the disks.

DISK - A disk is a magnetic medium used for storing data (refer to glossary for a more comprehensive definition).

DISK PACK - Refers to the removable magnetic platter housed in a plastic cartridge.

TYPE OF INFORMATION STORED ON DISK - Alphanumeric and graphic products are partitioned in a two disk configuration at each WSFO. (The same type of information is stored on one disk at the WSOs). The information content stored on each WSFO disk follows:

	DPCM
Removable Disk	The operating system
	The AFOS program
	Local and national A/N product files
	1/2 of graphic files
Fixed Disk	Copy of key files
	Copy of communication files buffer
	Copy of asynchronous transmission schedule
	Other protected files
	Applications program
	Display tables

continued

AFOS DATA BASE OVERVIEW

	DCM
Removable Disk	Operating system
	AFOS program
	Local and national A/N product files
	Other 1/2 graphic files
Fixed Disk	Other A/N Product files
	Key files
	Communication files (1/2 hr. worth buffer)
	Copy of display tables
	Asynchronous transmission schedule files
	Other protected files

Note: 1) The above distribution can be considered typical, but it is by no means set.

2) Since "other A/N product files" are stored on DCM fixed disk, if the DCM goes down these files are unavailable.

3) Each disk will contain 5 megabytes of data. This allows each computer a total data base of 10 megabytes/disk drive.

WSFO: Total of 20 megabytes of data.

WSO: Total of 10 megabytes of data.

4) "Copy" means that the information is stored redundantly.

Two characteristics that differentiate the data from the rest of the information on disk are:

The data base products all have an assigend AFOS product identifier.

The data base products are all subject to automatic purging (erasing) from disk.

The redundant storage (of duplicated critical information on the DCPM DPØ and DCM DPØ) allows the WSFO to operate with little disruption if either disk were to fail. You still would have access to all locally and nationally produced alphanumeric (A/N) products and to the software operating system managing the computer operations. If the DPCM DPØ fails,

continued

none of the other alphanumeric data would be lost. If the failure was in the DCM DPØ, you would have lost access to all alphanumeric data that were not locally or nationally produced. You could use request/reply to store select products you require.

If either disk fails, you would have lost access to one-half of your graphics. You would know which specific graphics were lost since they are assigned to a specific disk pack. The graphics are divided between the two disks in such a way to minimize the impact of losing use of either disk.

CHAPTER 4

SYSTEM OPERATION

SYSTEM OPERATION

INTRODUCTION

Occasionally, the AFOS system will fail to respond as expected. This is termed a "FAULT". AFOS operators must be able to recognize faults as they occur and to initiate procedures to restore the system to normal operational status.

The AFOS operator is the principal person to detect and initiate correction of system failures. Some faults can be handled by the operator alone but many will require coordination with SMCC.

In general, the operator's function in case of a fault will involve one or more of the following:

Recognize that a problem exists.

Analyze symptoms and locate the cause, if possible.

Correct problem(s) if possible, otherwise, call SMCC.

The material in this chapter is written primarily for pre-Version I and will be replaced when Version I is implemented. In general, it discusses how to recognize a problem, how to analyze the problem, and how to recover from the problem.

The recovery portion of the chapter covers procedures to restart AFOS or reboot RDOS when a program failure occurs.

When you have a problem that cannot be resolved at the site, you are expected to call SMCC. They will help you isolate the problem and guide you through the steps necessary to resume normal operations.

This might involve using SMCC temporatily for access to data on the NDC or for advice on how to arrange an alternate mode of operation for your station.

SYSTEM OPERATION

TOPIC 1: FAULT RECOGNITION AND SYSTEM ANALYSIS

INTRODUCTION

When a fault occurs, in most cases, an incorrect answer or error message will be displayed on the ADM or an error code will print out on the KB/P. Occasionally, you may not get a response because of a system malfunction.

Faults will arise from human error (operator error) i.e., something you did recently at an AFOS console or the CCM front panel switches. Some faults are caused by system errors (malfunctions). Again, resolutions of some faults can be handled by the operator while others will require coordination with SMCC.

SYSTEM OPERATION

SECTION A: Failures Due To Operator Error

EXPLANATION: In this section AFOS operators will learn how to recognize some faults due to errors in procedure - and how to avoid such errors.

Operator Error is generally some error in procedure. For example:

misspelled words

mis-set switches

invalid sequence of commands

Usually system failure due to operator error is caused by something done recently at: the ADM keyboard, the CCM, or the KB/P.

When the AFOS system fails to respond as expected, including no response, it may be operator error.

If the system responds to a repeated command or corrected procedure, the cause was probably operator error.

Remember: A computer will not operate correctly unless the commands given it are EXACTLY right.

There are more ways to incorrectly command a computer than to correctly command a computer.

Operators MUST develop methodical work habits when operating AFOS equipment.

SECTION B: Failures Due to System Errors

EXPLANATION: In this section the operator will learn how to recognize faults due to system errors.

System Errors are those errors which prevent the system from performing as instructed. For example:

hardware component failures

communication line problems

software bugs

The system will make a log entry of an error message (in the system error log) indicating the malfunction. The message "SYSTEM ERROR" will be displayed on the ADM.

Call SMCC when an error message is displayed that you do not understand.

SECTION C: ADM Error Messages

EXPLANATION: In this section the operator will become familiar with some of the error messages that are displayed on the ADM.

The error messages that are displayed on the ADM are generated from the AFOS operating system. Some of these are advisories, e.g., upon automatic switching to a backup network circuit. Most indicate system anomalies which the software chooses not to cope with directly, but rather wants to bring to your attention for appropriate action.

Some of the messages may reflect software malfunctions and others simply hardware malfunctions that are not immediately recoverable without your help.

Some of these advisory/error messages are:

Invalid Command

Invalid PIL I.D.

Syntax Error

Product CCCNNNXXX.nn Not Archived

A listing of the more common advisory and error messages will be in an appendix to the AFOS Training Guide.

For software problems or messages you don't understand, consult SMCC.

SECTION D: KB/P Error Messages

EXPLANATION: This section introduces you to system generated messages that print out on the KB/P in response to a malfunction.

Most of the messages that appear on the alphanumeric display screen will also appear on the KB/P. System errors activate your alarm and are entered in the system error log for display on your ADM. In addition, there are several extraordinary error messages (always printed on the KB/P) to indicate drastic software or hardware mishaps, as follows:

Message: "TRAP = Number Number Number Number Number"

"BREAK"

"R"

Reason: You have a problem with software

Action: You may have to restart AFOS. You should double check with SMCC unless you know you have caused the fault.

Message: "Number Number Number Number Number"

Reason: You have a panic halt and your input devices (ADM and KB/P) are probably all dead and unresponsive.

Action: Try all your consoles. Always call SMCC. You may be able to reboot and do a cleanup, if this was only a temporary hardware problem. More often, you will need your El Tech to run hardware checks.

Message: "POWER RESTORED"

Reason: If your Eclipse has its key in lock position, the software should be able to resume automatically after brief power outages and will print this message when doing so.

Action: If a short outage, no action is needed. If long, you may have to restart or reboot with a cleanup; you should consult SMCC first.

AFOS TRAINING GLOSSARY

AFOS TRAINING GLOSSARY

A	1. Alphanumeric as in ADM or 2. Alphanumeric display screen as in AG, AK, AGG, etc.
AAU	Automatic Answering Unit - 1. Part of ADU 2. part of each synchronous mode
ACPC	AC Power Control
ACU	Automaic Calling Unit
ADAS	Automatic Data Acquisition System
ADCCP	Advanced Data Communications Control Procedure
ADM	Alphanumeric Display Module
ADU	Automatic Dialing Unit (part of the DTCA)
AERO FORD	Former acronym for the Ford Aerospace and Communications Corporation
AFGWC	Air Force Global Weather Central
AFOS	Automation of Field Operations and Services
AG, AGG, or AGGG	AFOS operator console configurations of one alphanumeric display module and one, two, or three graphic display modules, listed from left to right.
AIRS	Aviation Information Retrieval System. The AFOS software assisted pilot briefing program.
AK	Alphanumeric Display Screen with a Keyboard
ALARM	In AFOS - The flashing of the alarm key accompanied by a tone (both at the AFOS operator console)
ALERT	In AFOS - The flashing of the alarm key at the AFOS Operator Console.
ALM	Asychronous Line Multiplexer
AMOS	Automatic Meteorological Observing Station
A/N	Alphanumeric as in AlphaNumeric data - data composed of letters and numbers

ANALOG DATA — A data format which permits the representation of all values of a parameter as a continuous line (e.g. a sine wave or curve which represents all values of the sine for all angles. In this case all does not mean just whole integers, if it did then the curve would be a series of dots connected by squared-off lines). (See digital data).

ARCHIVE (LOWER CASE) — To save in storage, as in records, files or documents

ARCHIVE — The AFOS software which accomplishes the automatic storing (archiving) of locally prepared products onto a floppy disk.

ASYNCHRONOUS — 1. Not synchronous 2. In AFOS data transmission where each character consists of 5 to 8 bits preceeded by a "ZERO" start bit and followed by a "ONE" stop bit. Each bit is of equal duration except the stop bit may be one and one half or two times as long as the others.

Such data is read bit by bit until a character is complete and then it is passed on.

BACKGROUND — In simultaneous multiple program processing the computer environment (resource area) in which lowest priority programs are executed. In AFOS, which uses a multipartition processor, background is the area dedicated to the execution of single programs on a non-interrupt, first in - first out basis. All programs executed in background have the lowest priority in accessing foreground resources (e.g. data access, calculation, data transfer, etc.)

BACKGROUND — See MAP BACKGROUND for grahpics

BAUD — A unit of signaling speed equal to the number of discrete conditions or signal events per second. For example, one baud equals one bit per second in a train of binary signals.

BAUDOT CODE — A code for the transmission of data in which five equal-length bits represent one character. Example, most of our teletypewriter machine code.

BIT — A binary digit (Ø or 1)

BLOCK — A group of bits transmitted as a unit. (The maximum AFOS block is 2048 bits (256 bytes). The maximum RDOS block is 2 AFOS blocks).

BOARD — A small, thin, rectangular piece of non-conducting material with attached or superimposed printed circuits (PC) and other various electronic components and provided with electrical connections to a power source.

BOOT (BOOT STRAP) — In general - A technique or device used to bring about a desired state (e.g. ready to operate) in a piece of equipment, as a result of its own actions. In AFOS - 1. The firmware program which loads in and begins execution of the MRDOS program. 2. The entire procedure (step by step) required to use 1. and get the AFOS program started.

BPS — Bits Per Second

BUFFER — An auxillary data-storage device which holds data temporarily. May be used to compensate for a difference in rate of flow of data, or in time of occurance of events, when transmitting data from one device to another.

BUFFER STORAGE — 1. Any device temporarily storing data during a data transfer. 2. Secondary storage areas used exclusively for assembly and transfer of data between internal and external storage. 3. An output device into which data is copied from internal storage and held for transfer to external storage and while computation continues taking place.

BUS — A circuit over which data or power is transmitted. Often acts as a common connection among a number of locations, allowing data or power from any of several locations to be transferred to any of several destinations.

BYTE — 1. A unit of processing storage (e.g. one ASCII character = 8 bits = 1 byte. 2. A group of binary digits operated upon as a unit, usually shorter than a word.

C — Current (in the Category Inventory List). Indicates that products of that catagory are being stored.

CAS — In AFOS - Central Archival System

CATV — Cable Television - In AFOS, CATV codes are used to direct messages.

CCC	In AFOS product identifier format - indicates 1. An NDC node or product point of entry. 2. Any 3 charactrer identifier of an NDC node.
CCM	Communications Computer Module
CENTRAL PROCESSING UNIT	A section of the computer which includes the circuits controlling the interpretation and execution of instructions
CHARACTER	A letter, number or other symbol that is used as part of the organization, control, or representation of data. In AFOS 1 character is assigned 8 bits or 1 byte.
CIL	Category Inventory List
CLEANUP	In AFOS - 1. Any program or routine which makes sure that files containing data are closed (not subject to over-writing). 2. A program which prevents the loss of the data on a disk by systematically reading and recording the data contained on that disk, in order to recreate a directory file which may have been lost or altered.
CLI	Command Line Interpreter
CLS	Computer Language Store
COLD START	The entire process of taking the office's AFOS from a power off condition to an operational condition with the AFOS program running.
COMMS	Communications
CONSOLE	In AFOS - The operator console consisting of alphanumeric display(s) and keyboard with some consoles also having one or more graphic displays.
CORE MEMORY	A group of doughnut shaped pieces of magnetic material on wires, used for storing data by means of magnetic polarization of the individual core elements.
CPU	Central Processing Unit - see above
CRASH	An unplanned and/or uncontrolled halt in program execution.
CRT	Cathode Ray Tube - The electronic display screen.

CURSOR	A spot of light on a CRT, moved by keyboard inputs or by the trackball for a graphic display screen. Acts as a position indicator for the next character to appear, or as the center of a graphic zoom area.
CWF	Computer Worded Forecast
CYCLE TIME	1. The interval between the call for data from a storage device, and the delivery of that data to core memory. 2. For core memory - The total time required to read and rewrite one storage word of data. (Rewrite is necessary because reading erases the data from memory)
DARDC	Device for Automatic Remote Data Collection
DATA BASE	The portion of your computer memory where AFOS products are normally stored and are subject to automatic purging.
DATA BASE MANAGEMENT	A systematic approach to the storing, updating, and retrieval of information stored as data items, where several operations will use common data banks
DB	Data Base
DBM	Data Base Management
DCE	Data Communications Equipment - The interface between data transfer equipment and telephone company equipment
DCM	Data Communications Minicomputer
DCU	Data Communications Unit
DDD	Direct Distance Dialing (telephone term)
DEFAULT	In AFOS - The condition or value to which the system goes (or reverts) if other conditions or values are not specified.
DEGRADED MODE	A special conditon where the system continues, or is reconfigured to continue, operating but at a reduced level, due to the unavailability or failure of some unit or subsystem.
DIAGNOSTIC	Pertaining to the discovery, detection or isolation of a fault or malfunctiuon.

DIGITAL DATA	A data format which only permits the representation of discrete values, e.g. integers. It also permits the representation of discontinuous values or states without a false appearence of continuity, e.g. off-on. This last feature makes it ideal for computers.
DISK	A flat circular metal plate with magnetic material on both sides, on which data can be stored by selective magnetization. The disk is continuously rotated and is read or written on (data stored) by means of one or more read/write heads mounted on movable or fixed arms. Disks may be permanently mounted on a shaft (fixed disk) or may be contained in an assembly that allows easy removal and replacement (removable disk or disk pack).
DISKETTE (also FLOPPY DISK or FLEX DISK)	A flat round piece of flexible material covered with magnetic particles (on one or both sides). The diskette is encased in a square protective cover with write protect, indexing, read/write, and disk drive openings. The diskette is continuously rotated and accessed by a single read/write head on a movable arm.
DISPLAY	The visual presentation of data.
DMA	Direct Memory Access - Allows an address to be accessed within a given time period irrespective of its location. A result is that program access time to a given location is not dependent on the previously accessed location.
DPCM	Data Processing and Control Minicomputer
DSM	Dual Switching Module - if the dedicated line fails, the DSM switches the system to the dial-up line.
DTCA	Data Transfer Control Assembly
DTE	Data Terminal Equipment
DUPLEX	For transmission lines - 1. Line able to transmit data in two directions. 2. Also used to mean full-duplex, able to transmit data in two directions at the same time using two or four lines). Half-duplex means able to transmit data in either direction but only in one direction at a time.
E	Expired: In the AFOS Catagory Inventory List - A warning type product has expired and is still being stored

EDIS — Environmental Data Information Service (NOAA)

ERROR MESSAGE — A system generated message which is displyed on line 25 of the alphanumeric display screen. It indicates that the preceding operator input command was incorrect or could not be accomplished by the system. (Also see SYSTEM ERROR MESSAGE).

FACC — Ford Aerospace and Communications Corporation

FIFO — First In-First Out

FIRMWARE — Computer programs which are permantly "set" into a section of memory also called hard wired programs. Such firmware in storage is called read only memory (ROM) since it is not erased by being read and need not (in fact, can not) be rewritten in memory. Firmware is used to bootstrap the MRDOS program in the AFOS system.

FLEX DISK
FLOPPY DISK — See DISKETTE

FOFAX — Forecast Office Facsimile

FOREGROUND — In simultaneous multiple program processing - the computer environment (resource area) in which high priority programs are run. Programs run in foreground are able to utilize the computer central processing unit immediately when needed. In AFOS, which uses a multipartition processor, foreground is the area where all DCM operations are handled (at a WSFO) and where the actual AFOS program is run in the DCPM. While only one program is being run in the foreground, multiple tasks or subprograms are being run on a priority interrupt basis, i.e., if a priority task must be done (needs computer resources) the lower priority task is suspended until the needs of the higher priority task are satisfied. For example at a WSO (one computer), communications tasks have a higher priority than operator input tasks, therefore, when comms loads are high, system response to operator commands is somewhat slower.

G — Graphic Display Module as in GDM

GATEWAY — The methods, equipment and/or software used to transfer data between the existing communications systems and the AFOS NDC. This includes any necessary reformatting or heading changes. Gateway is located at Suitland, MD.

GDG	Graphics Display Generator
GDM	Graphic Display Module
GRAPHIC	1. A physical or pictorial representation of data as opposed to an alphanumeric representation. 2. In display methods - lines or figures produced by vectors or curves rather than by selections of fonts (alphanumeric characters or symbols).
GRAPHIC DISPLAY GENERATOR	The hardware which provides buffer storage in the CILS of data (both graphic and alphanumeric) from the computer. Using its own micro computer it reconverts data, which has been compacted for disk storage, and generates it for as many as three GDMs.
HARDWARE	All of the physical equipment which makes up the computer. (As opposed to the software that tells it what to do).
HASP	Houstin Asynchronous System Processor
ICE	Interpartition Communications Executive
INDIRECT	References other file contents, or commands, (e.g.,if an indirect file containing the names of other files is called for use, the data accessed will be that contained in the files named in the indirect file).
INITIALIZE	In general - to begin or start. In AFOS - 1. To bring a disk or diskette to its starting reference point so that the locations of stored data can be kept track of. 2. To give a command which starts a sequence or series of actions or responses. 3. To not only start a program or operation but to start it from its initial or beginning state. (i.e., as opposed to resuming it).
INTERLEAVING	1. Inserting segments of one program into another program to give the effect of executing two programs simultaneously. 2. Inserting higher priority data ahead of other data already awaiting transmission on a first in-first out, by priority, basis.
I/O	Input/Output
IPF	Internal Product File

IXC SWITCH	Interstate Exchange switch - a switch in the telephone lines to isolate node.
JCL	Job Control Language
K	1. 1Ø24 (a number),e.g., K bits= = 1Ø24 bits 2. Keyboard (e.g.,AK).
KB/P	Keyboard/Printer
KEYBOARD/PRINTER PRINTER/KEYBOARD	In AFOS - the device used to communicate with the minicomputer directly (one at a time in WSFO configuration).
MAP (ALSO MAPPING AND MAPPED)	In data processing generally - to establish a correspondence between the elements of one set and another. In AFOS - memory allocation and protection. An option of the eclipse computer allowing for expansion of CPU memory capabilities and for relocation of program access as execution is occurring. Virtual addresses (real time addresses) greater than 15 are transformed into references to actual core memory locations using all 96K of available memory. (The effect is that although the CPU, due to memory word size can only access 32K of core memory it is able to use 96K of core (32K at a time controlled by the mapping unit).
MAP BACKGROUND	The geographical reference field over which the data fields are laid to construct a graphic chart. contains latitude and longitude lines plus a geographical outline with or without state and/or national borders.
MC	Message Composition
MCA	Multiprocessor Communications Adapter
MCP	Message Composition Preformat
MEMORY	See STORAGE
MINICOMPUTER	A computer using a relatively small word size (12- 32 bits) and having a correspondingly restricted core memory.

MMPU	Memory Management and Protection Unit
MODEM	Modulator - Demodulator - A device which converts data from a form used with data processing equipment (digital) to a form used with transmission facilities (analog) and vice-versa.
MRDOS	Mapped Realtime Disk Operating System
MULTIPLEXER	1. A device used to transfer data from several storage devices operating at relatively slow transfer rates to one storage device operating at a high transfer rate. In such a way that the high rate device does not have to wait for the lower speed units. 2. A communications multiplexer - A link between the processor and several communication line terminals, handling both input and output from the terminals so as to minimize processor waiting time.
NCC	National Climatic Center
NDC	National Distribution Circuit
NHC	National Hurricane Center
NMC	National Meteorological Center
NNN	In the AFOS product identifier format - the general form indicating an AFOS product category.
NODE	A data exchange point on the AFOS National Distribution Circuit - A WSFO, National Center, or NMC-SMCC.
NSSFC	National Severe Storms Forecast Center
NWWS	NOAA Weather Wire Service
ODG	Original Digital Guidance
OPERATOR CONSOLE	The data/commmand entry keyboard (ZENTEC) and associated CRT displays.
OS	Operating System
OVERLAY	On AFOS Displays - To superimpose one or more data fields (or alphanumerics) over an original field and/or map background (e.g. a 500mb contour field overlaid on a 500mb temperature field and North American map background).

OWF	Original Worded Forecast
P	In the AFOS Category Inventory List - Products in this category are normally stored in local data base but all stored versions have been purged.
PAGE	1. One Display Screen of data. 2. I.E. to PAGE through - To go from one screen's worth of data to the next using the next page key or a paging command.
PARITY (PARITY CHECK)	Setting the eveness or oddness of the total number of ones in a computer word by use of an extra bit (parity bit) is setting its parity. A test for a particular type of parity is made of each word as an error check. For example, if even parity is designated for the system, then parity bits in each word will be set so that the total number of "ONE" bits in each word is an even number. As each word is stored a check is made of the sum of the binary digits in the word and of the parity bit. If the sum is even the bit should be zero; if the sum is odd, the bit should be one. if the word has been altered in transmission, chances are good that it will fail the parity check and be flagged as erroneous.
PARTITION	1. To divide or separate 2. A software barrier between two areas of computer program execution or computer resource priorities (e.g. foreground and background).
PC	Printed Circuit
PIL	Product Inventory List
P/P	Printer/Plotter
PPM	Printer/Plotter Module
PROCEDURE (UPPER CASE)	In AFOS - A program which allows the retrieval and display of one or more products in a specific sequence and at specific times.
PROCEDURE (LOWER CASE)	The specific steps required to accomplish a task.
PROCESSOR	A device capable of receiving data, manipulating it, and supplying results, usually from an internally stored program. 2. Shorthand for an automatic data processor or arithmetic unit.

PROGRAM	1. A plan for the automated solution of a program. 2. A set of instuctions or steps that tells the computer exactly what to do to resolve a given problem or to achieve a desired result.
QUEUE	1. A waiting line or list made up of items in a system awaiting processing or transmission. 2. To place in a line or queue.
RAS	Remote Assistance Section
RDO	River District Office
RDOS	Realtime Disk Operating System
REBOOT	To repeat the booting (bootstrapping) process in order to recover from a computer crash.
REMOTE STATION	In AFOS - A station that has input, message composition, and display capability but uses a computer at another station.
RESTART	The portion of the rebooting procedure in which the AFOS program is initiated.
RFC	River Forecast Center
ROUTINE	An ordered set of computer program instructions that may have a general or frequent usefulness to a number of different programs; or, which may be accessed several times by a single program.
RTC	Real Time Clock
SDC	State Distribution Circuit (occasionally called a Star Network).
SLM	Synchronous Line Multipleror
SMCC	System Monitoring and Coordination Center
SOFTWARE	The set of programs, procedures, and, possible, associated documentation controlling and describing the operation of a data processing system.

STORAGE	1. Any device capable of retaining data 2. Any device into which data can be copied, held, and recovered on demand at some later time.
SYNCHRONOUS	In AFOS Data Transmission - Continous transmission with regular timing (as opposed to the start-stop process of asynchronous transmission). The bits of one character are immediately followed by those of the next without the use of start and stop bits or pauses. The character stream is divided into blocks of fixed length with sychronization signals ahead of a block and error checking signals at the end. (Block sizes vary from system to system).
"SYSTEM ERROR" MESSAGE	1. A message retrieved from the system error log after the audio alarm key is pressed, when "system error" is displayed on line 24 of the alphanumeric display screen. 2. A statement in the system error log indicating that something has occured which prevents the system from functioning properly, or, which prevents the system from obeying an operator command (e.g. trying to archive a product already archived).
SYSTEM ERRORS	Hardware, software, or operator input command, problems or failures which prevent the system from performing as instructed.
TAP	Terminal Alert Procedure
TELCO	Telephone Company
WORD	1. A set of characters that occupies one storage location and is treated as a unit by computer circuits (an instruction or quanity). 2. A unit of data 3. In data transmission (teletype) - five characters plus one space or six key strokes.
XXX (UPPER OR LOWER CASE).	In AFOS product identifier format - The general form of a product designator (frequently a three character location identifier).

ZENTEC — Product name of the AFOS keyboard with internal microcomputer which is used at the operator console.

☆ U. S. GOVERNMENT PRINTING OFFICE : 1978 261-238/208

PENN STATE UNIVERSITY LIBRARIES
A00007094055S